NEC

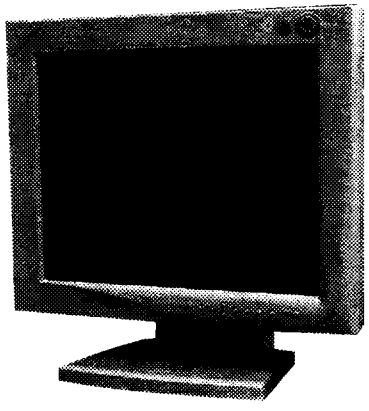
MODELS LA-1831JMW (A)/(B)

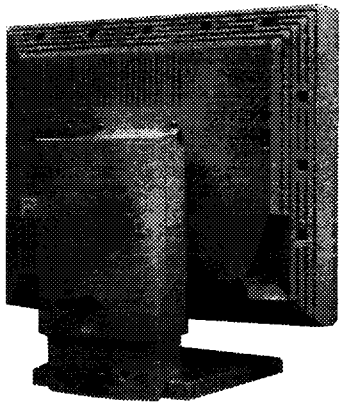
COLOR MONITOR **MultiSync® LCD1810**

SERVICE MANUAL

PART NO. 599910469

Better Service
Better Reputation
Better Profit





NEC Corporation
TOKYO, JAPAN

SPECIFICATIONS

Display	46 cm (18.1 inch) viewable image size; 1280 x 1024 native resolution (Pixel Count); active matrix; thin film transistor (TFT); liquid crystal display (LCD); 0.28 mm dot pitch; 200 cd/m^2 white luminance, typical; 150:1 contrast ratio, typical		
Input Signal	Video	Analog 0.7 Vp-p 75 Ω	
	Sync	Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative Composite sync. (Positive/Negative) (TTL Level) Sync on Green video (Positive) 0.7 Vp-p and sync. Negative 0.3 Vp-p	
Display Colours	Analog Input:	Unlimited number of colours (Depends on the graphics board)	
Synchronisation Range	Horizontal Vertical	24.0 kHz to 80.0 kHz (Automatically) 56.0 Hz to 76.0 Hz (Automatically)	
Resolutions Supported	Landscape	720 x 400: VGA text* 640 x 480 at 60 Hz to 76 Hz 800 x 600 at 56 Hz to 76 Hz* 832 x 624 at 75 Hz* 1024 x 768 at 60 Hz to 76 Hz* 1280 x 960 at 60 Hz to 76 Hz 1280 x 1024 at 60 Hz to 76 Hz**	
	Portrait	480 x 640: at 60Hz to 76Hz 600x 800 at 56 Hz to 76 Hz* 624 x 832 at 75 Hz* 768 x 1024 at 60 Hz to 76 Hz* 960 x 1280 at 60 Hz to 76 Hz 1024 x 1280 at 60 Hz to 76 Hz**	
Active Display Area***	Landscape	Horizontal	359 mm
		Vertical	287 mm
	Portrait	Horizontal	287 mm
		Vertical	359 mm

Power supply		AC 100-120 V / 220-240 V @ 50/60 Hz
Current Rating		0.9A @ 100-120V / 0.5A @ 220-240V
Dimensions	Landscape Portrait Hight Adjust	454(W) x 461(H) x 262(D) mm 382(W) x 497(H) x 262(D) mm 70mm
Weight		10.0kg
Operating Environmental Considerations	Temperature Humidity	5° C to + 35° C 30% to 80%
Storage Environmental Considerations	Temperature Humidity	-10° C to + 60° C 10% to 85%

* Interpolated Resolutions: when resolutions are shown that are lower than the pixel count of the LCD module, text may appear choppy or lines may appear to be bold. This is normal and necessary for all current flat panel technologies, each dot on the screen is actually one pixel, so to expand resolutions to full screen, an interpolation of the resolution must be done. When the interpolated resolutions is not an exact multiple of the native resolution, the mathematical interpolation necessary may cause some lines to appear thicker than others.

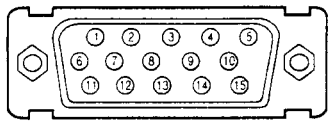
** NEC cites recommended resolutions at 60 Hz for optimal display performance.

*** Active display area is dependent upon the signal timing.

Technical specifications are subject to change without notice.

APP. A PIN ASSIGNMENTS

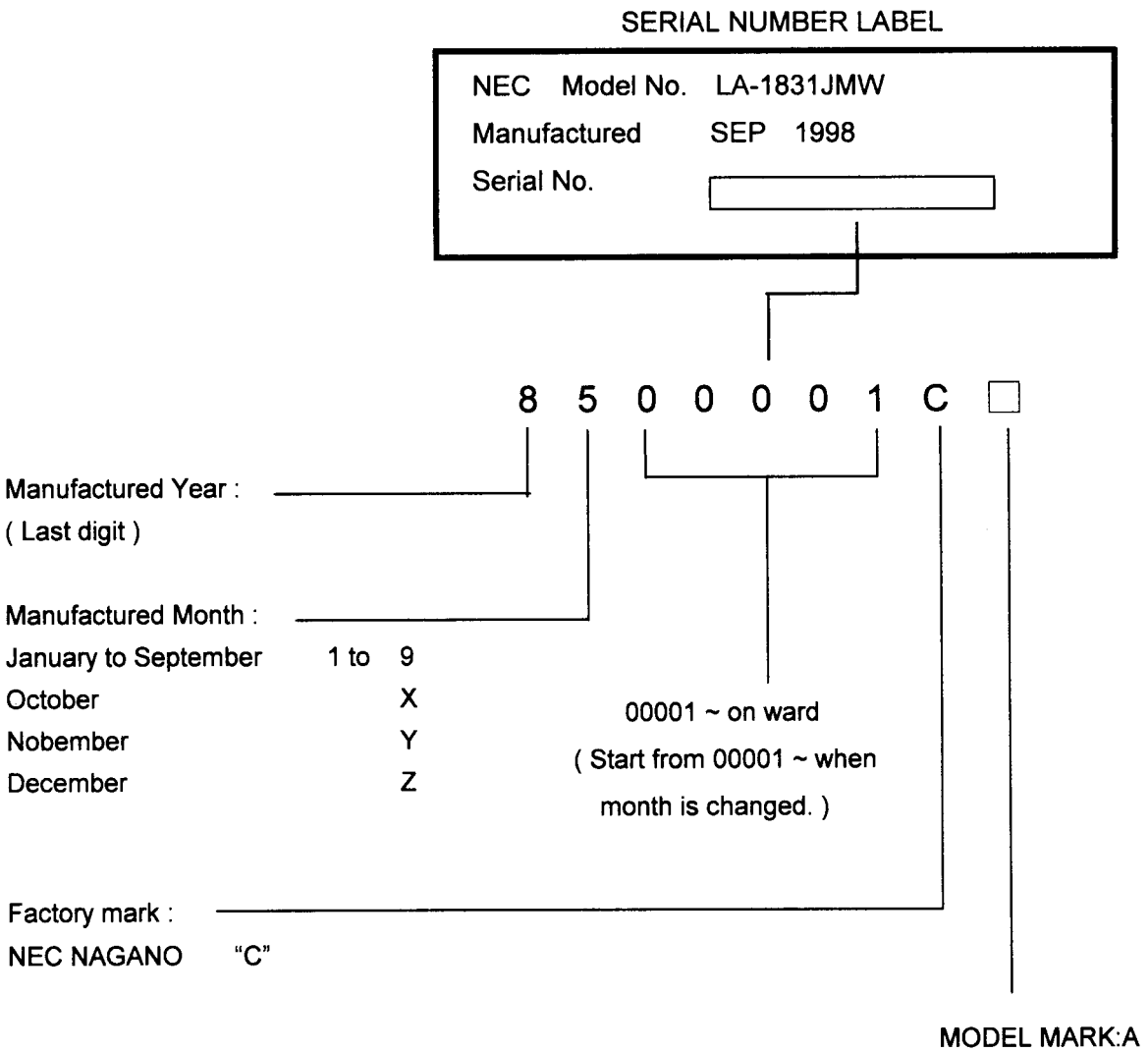
MINI D-SUB 15 P



Pin No.	LCD1810
1	RED
2	GREEN
3	BLUE
4	NO-CONNECTION
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	+5V (DDC)
10	GROUND
11	GROUND
12	SDA
13	H.SYNC, H/V.SYNC
14	V.SYNC
15	SCL

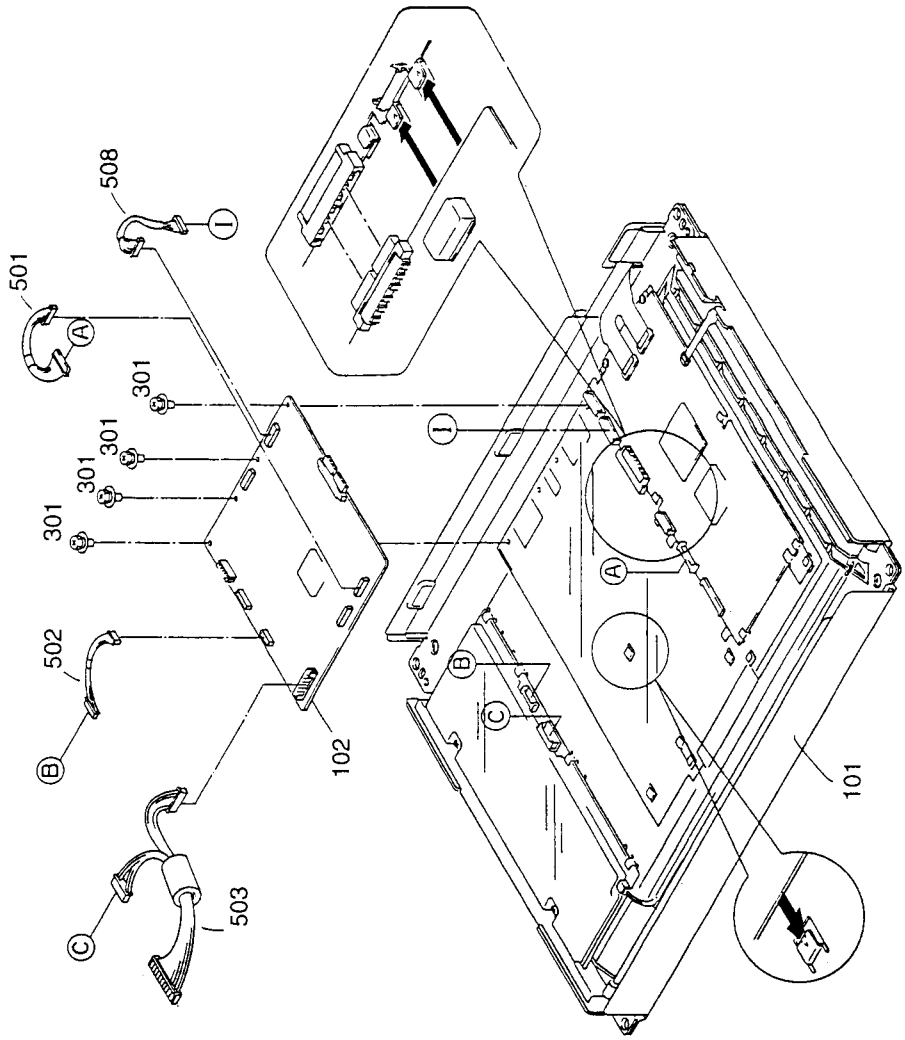
SERIAL NUMBER INFORMATION

Refer to the serial number information shown below.

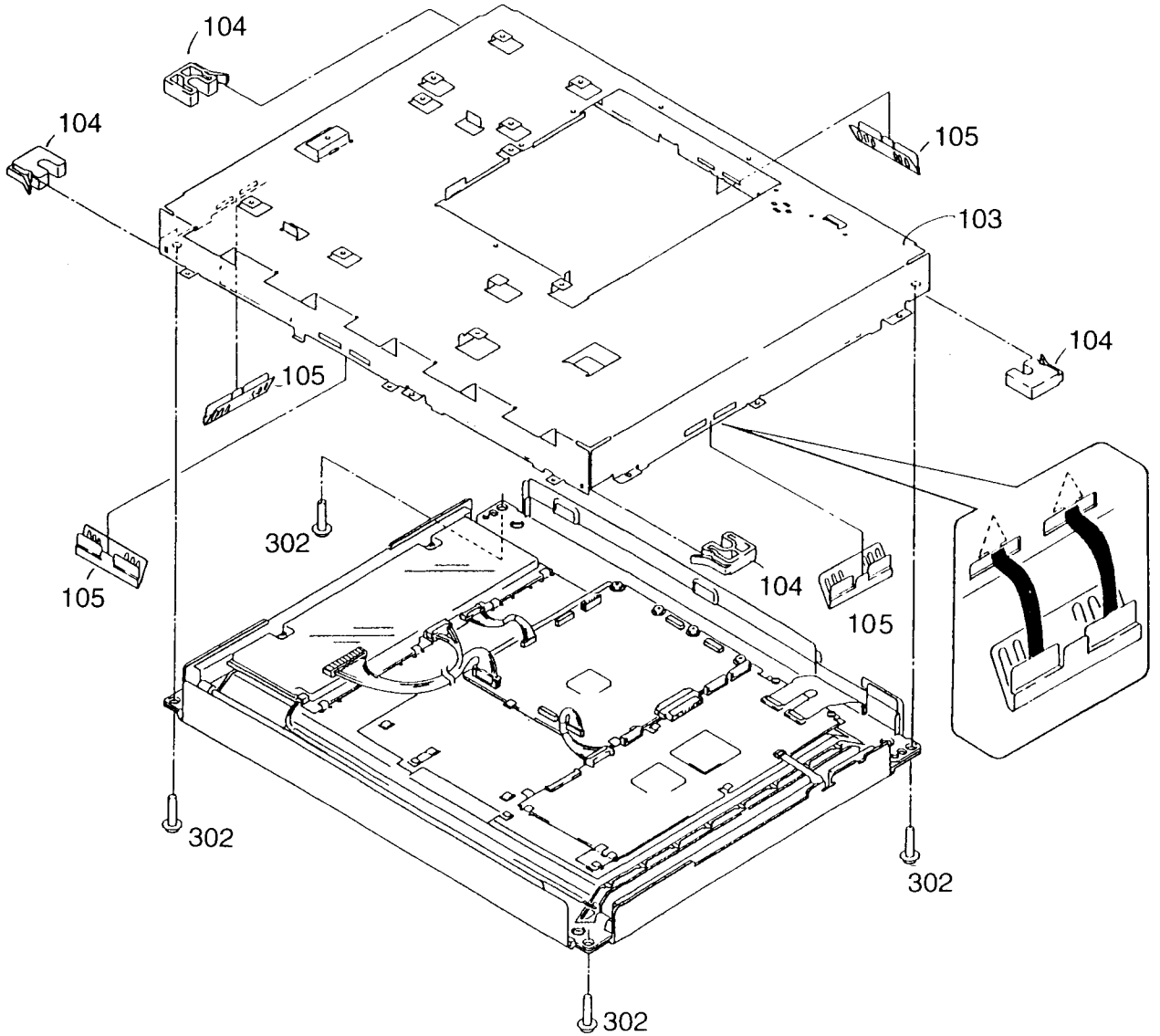


ASSEMBLY

- Before you disassemble the set, turn off power and pull out the power plug.
- Use the proper screwdriver. If oversize or undersize screwdriver is used, screws may be damaged.
- Disassembly is the opposite process of assembly.



SYMBOL	
REMARK	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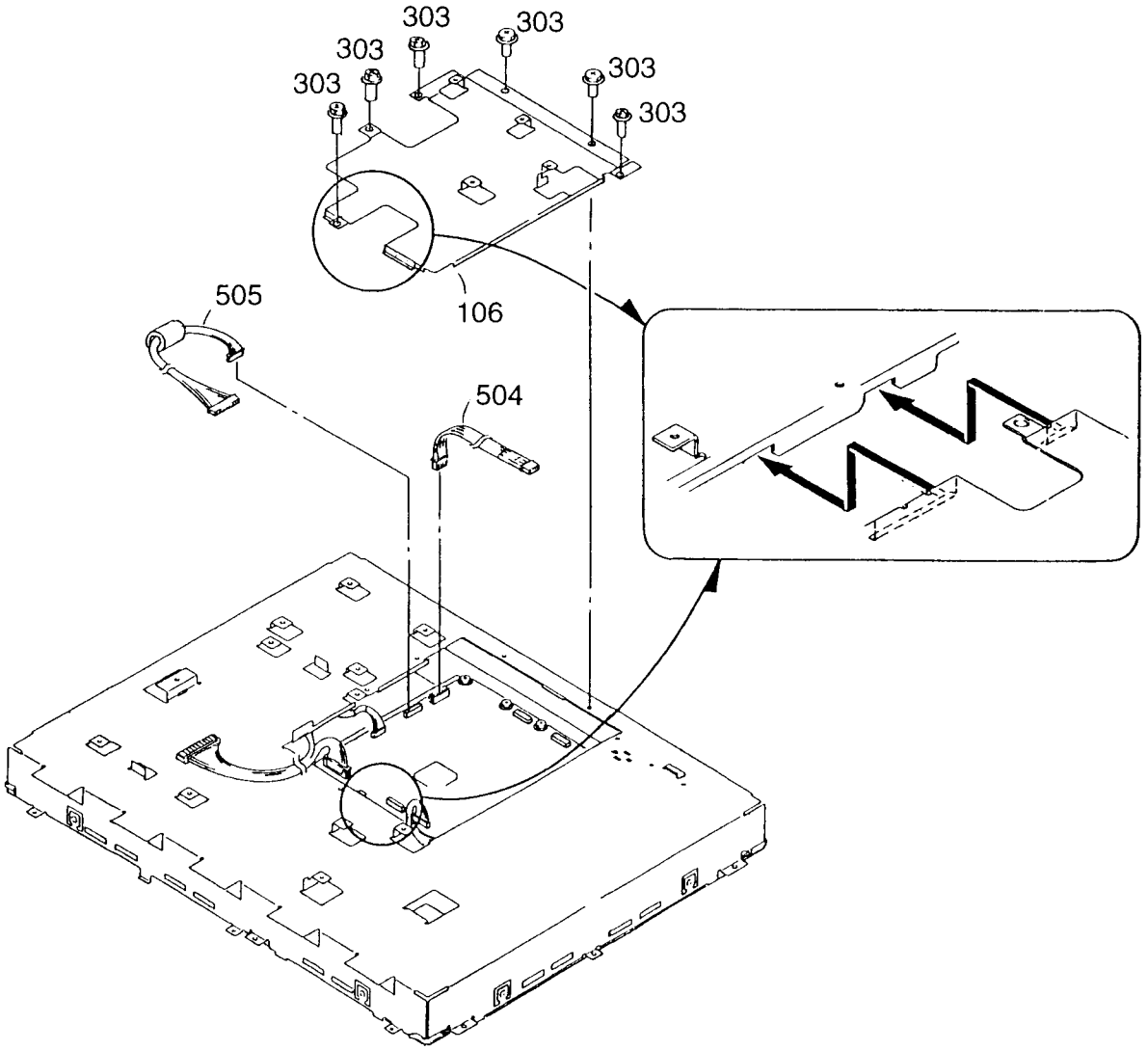
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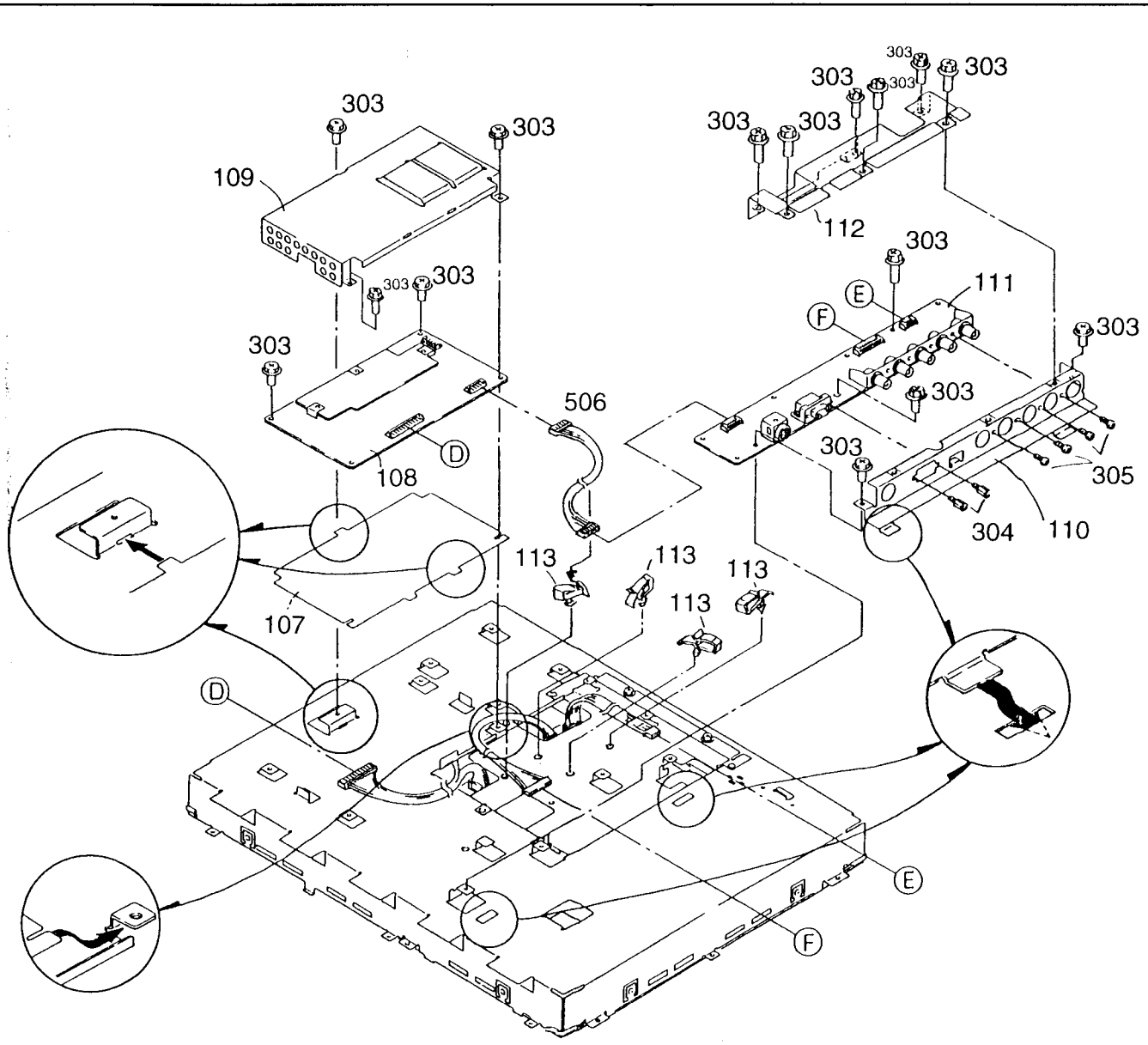
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112
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111
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506
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D
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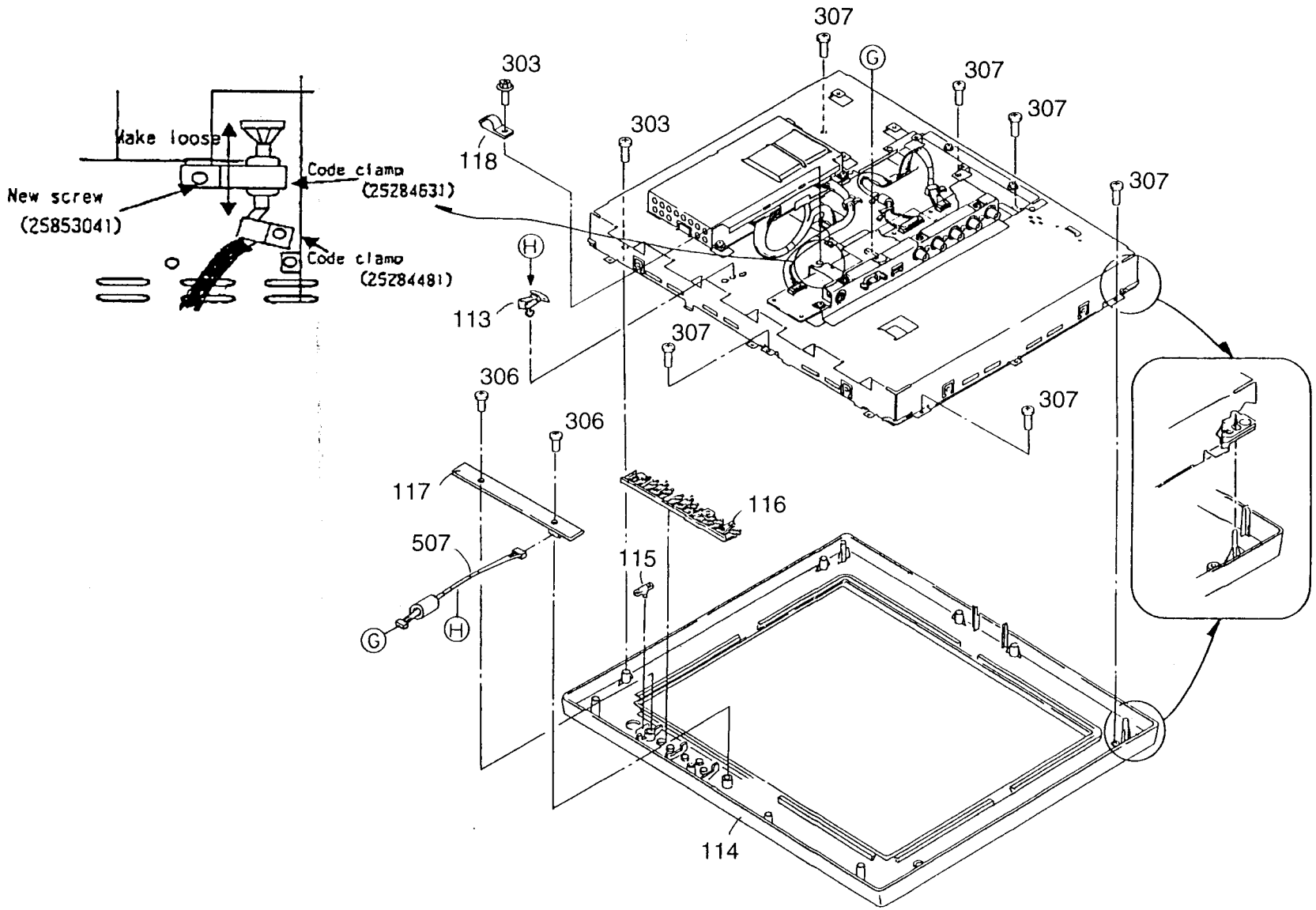
113
107
D
E
F


Make loose
Code clamp
(25284631)
New screw
(25853041)
Code clamp
(25284481)
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303
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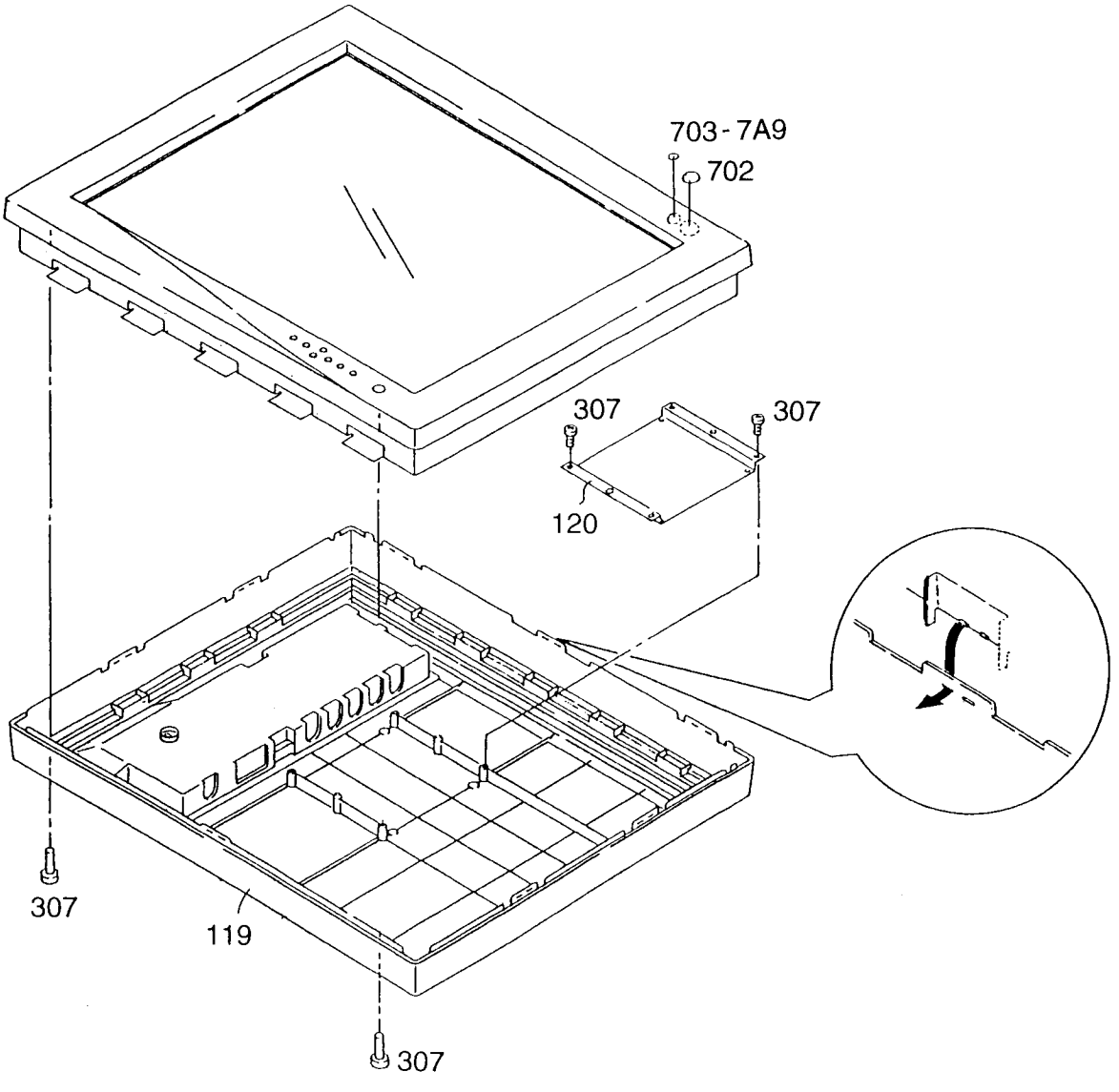
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702
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119
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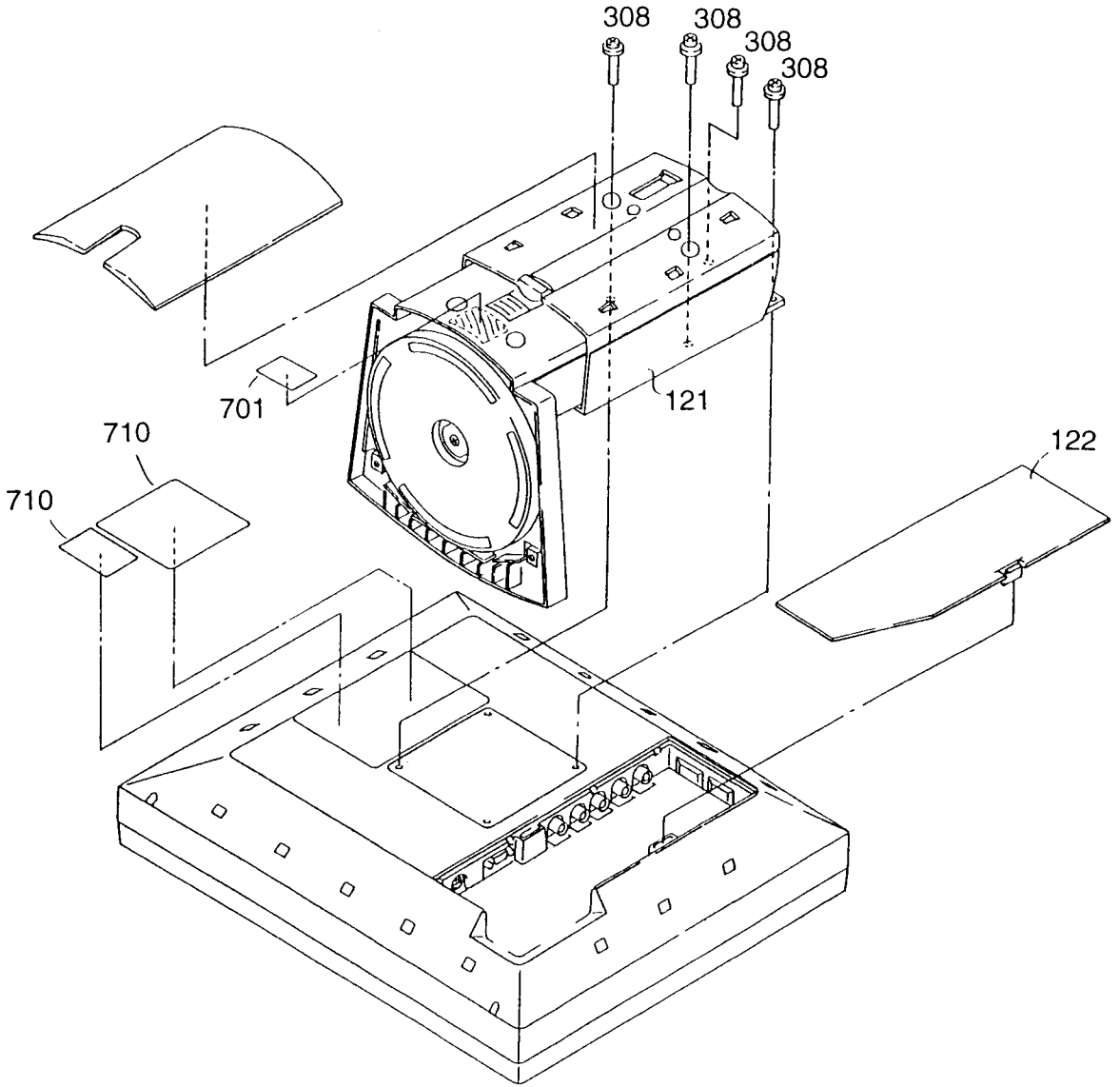
308
308
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308
701
121
710
710
122

Rev.	ACN	SYMBOL	CODE	DESCRIPTION	T/N	Qty	REMARKS
			24852321	SCREW,PL-C6IMS*3*6*15CF		04	
			25260941	STAND ASSY		01	
			25284041	CLAMPER,WIRE		05	
			25284481	CLAMPER, WIRE (FGC-5)		01	
			25284631	CLAMPER,WIRE		01	
			25322081	CABINET BACK ASSY		01	
			25322371	CABINET FRONT		01	
			25429841	LENS		01	
			25430471	FILLER(LCD)		04	
			25430481	LID(CONNECTOR)		01	
			25457711	POSH BUTTON		01	
			25547972	CHASSIS BASE		01	
			25547981	BRACKET(CONNECTOR)		01	
			25547991	BRACKET,STAND		01	
			25548001	PLATE SHIELDING,MAIN		01	
			25618121	BARRIER(D/D CON)		01	
			25786161	LABEL(TCO95)		01	
			25787222	CAUTION LABEL		01	
			25851641	SCREW,CBIPS*3*8*15BF		02	
			25852321	SCREW3*10*3AF		11	
			25853021	CHEXISS(CUP)*3*8*15BF		21	
			25853041	PL-CPISS*3*12*15BF		01	
			25853141	SSCREW,SPECIAL(HEX)		02	
			25853231	SCREW,SPECIAL(CPISS*3*14)		04	
			36804245	LCD NL128102AC28-01		01	
			74109251	LEAF SPRING(LCD)		04	
			74400211	PLATE SHIELDING(D/D CON)		01	
			74400611	PLATE SHIELDING(CN)		01	
			847A9103	MAIN PWB ASSY		01	
			847A9202	CN PWB ASSY		01	
			847A9301	CTRL PWB ASSY		01	
			847A9801	DC-DC CONV. ASSY		01	
			852D6681	LABEL SASSY		01	
			866A4101	ADAPTER COVER ASSY		01	
			910E406L	PL-CPIMS*4*16*3GF		04	
			91013031	SCREW,CPIMS*3*6*15BF		04	
		CABLEA	73891304	POWER CABLE(CN750)		01	
		CABLE3	73891297	INVERTER CABLE(CN750)		01	
		CABLE4	73891298	OSD CABLE(CN750)		01	
		CABLE5	73891299	CONTROL CABLE(CN750)		01	
		CABLE6	73891300	SIGNAL CABLE(CN750)		01	
		CABLE7	73891301	VIDEO CABLE(CN750)		01	
		CABLE9	73891303	DC-CN CABLE(CN750)		01	

ADJUSTMENT PROCEDURE

1. DC/DC converter adjustment

1.1 Specifications

1) Input voltage : DC +24V
2) Rated input voltage : DC +22.8V~26.4V
3) DC output

Output voltage	+24V	+12V(A)	+12V(B)	+ 5V	-5V	+5V(B)	+12V(C)	PDLOP(24V)
Maximum output current	0.08A	1.3A	4.00A	1.03A	0.08A	0.2A	0.12A	200 μ A
Minimum output current	0A	0.8A	1.0A	0.13A	0A	0A	0A	-
Range of voltage fluctuation	±10%	±4%	+5% -3%	±4%	±5%	±5%	±5%	-
Ripple voltage	100mvp-p	100mvp-p	400mvp-p	50mvp-p	100mvp-p	100mvp-p	100mvp-p	+10%/-16%
Ripple noise voltage	200mvp-p	200mvp-p	400mvp-p	150mvp-p	200mvp-p	200mvp-p	200mvp-p	-

1.2 Before aging check visually

- The contact checking of a part.
- The polarity checking by the electrolysis condenser.
- The polarity checking by IC.
- The polarity checking by the diode.

1.3 Adjustment methods

1.3.1 Adjustment conditions

- Input voltage : DC +23.9V~24.1V
- Load condition of adjustment

Output voltage	+24V	+12V(A)	+12V(B)	+ 5V	-5V	+5V(B)	+12V(C)	PDLOP(24V)
Load current	0.05A	1.3A	4.75A	1.03A	0.08A	0.2A	0.12A	200 μ A
Load resistance	480Ω	9.23Ω	2.53Ω	4.85Ω	62.5Ω	25Ω	100Ω	200 μ A

1.3.2 Adjustment procedure

① Connect a connector respectively like figures 1, 2, 3.
② Turn VR fully counterclockwise.
③ Turn on switches by SW1, 2, 3, 4 in order.
④ Adjust both edge voltage of R1 on 11.9V±0.1 V by turning VR701 clockwise.
⑤ Turn off switches by SW4, 3, 2, 1 in order.

1.3.3 Connecting chart

· Input side

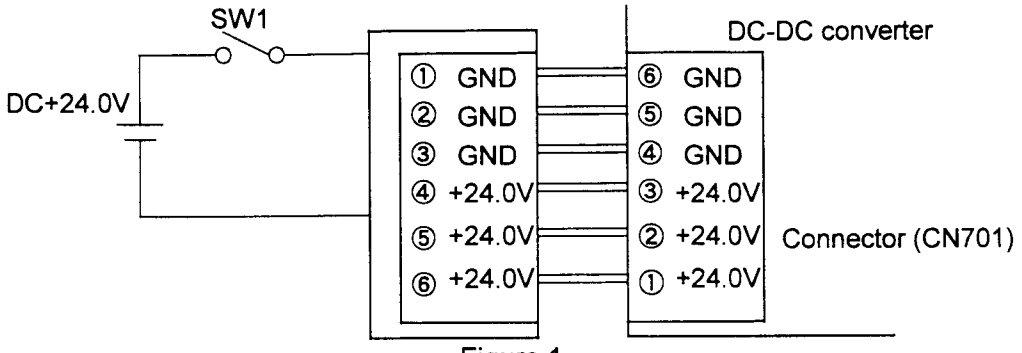


Figure 1

· Output side

DC-DC converter

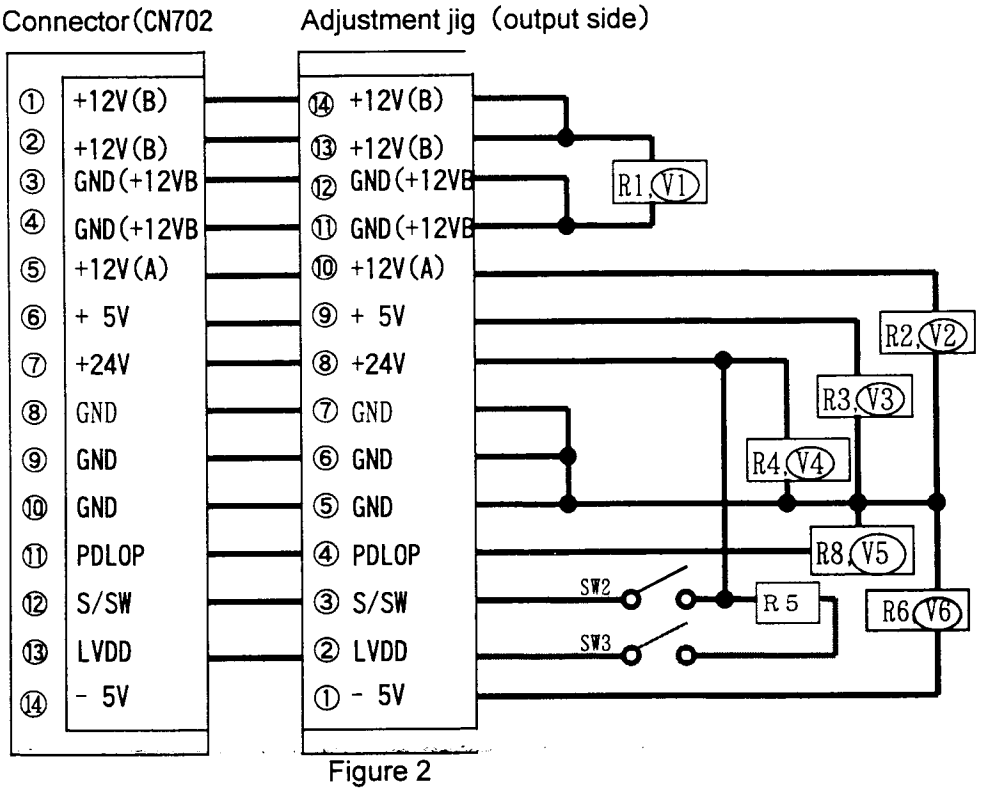


Figure 2

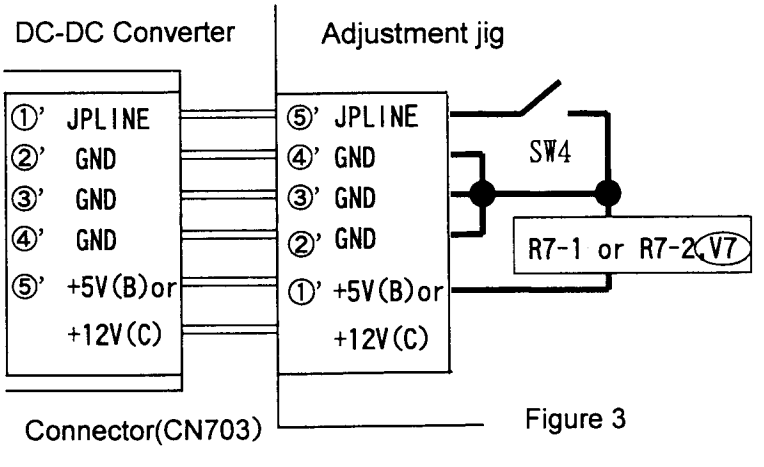


Figure 3

R1 : 3.0 Ω

R2 : 9.23Ω

R3 : 4.85Ω

R4 : 3.300Ω

R5 : 2.2KΩ

R6 : 62.5Ω

R7-1 : 25Ω (SW4 OFF: Output 5V)

R7-2 : 100Ω (SW4 ON: Output 12V)

R8 : 120KΩ

1.3.4 Connector specification

DC-DC converter output CN702

Pin No.	Signal name	Input/output
1	+12V(B)	Out
2	+12V(B)	Out
3	GND(+12V(B))	—
4	GND(+12V(B))	—
5	+12V(A)	Out
6	+5V	Out
7	+24V	Out
8	GND	—
9	GND	—
10	GND	—
11	PDLOP	Out
12	S/SW	In
13	LVDD	In
14	-5V	OUT

DC-DC converter output CN703

Pin No.	Signal name	Input/output
1	JPLINE	Out
2	GND	Out
3	GND	—
4	GND	—
5	+5V(B) or +12V(c)	Out

2. Set Adjustment

2-1. Measuring Equipment Required

The measuring equipment is required for adjusting the LA-1831 JMW board:

① Pre-adjusted VG-819
② Oscilloscope

2-2. Supply Voltage

LA-1831JMW(A) : 120 V, 60 Hz
LA-1831JMW(B) : 220V, 50/60Hz

2-3. Aging

Leave the device on for 20 minutes before adjustment. To leave the device on without inputting a video signal, select the aging mode as follows:

①Turn the power switch on without inputting video and sync signals.
②Press the PROCEED key to display the OSD.
③While holding down the PROCEED key, press the "◀(LEFT) , ▶(RIGHT) " key to clear the OSD screen.

After the above procedure, nothing is displayed on the screen but the power remains on.
Although the display screen is the same in both aging mode and power save mode, the current mode can be identified as follows:

Aging mode : OSD is only displayed by pressing the EXIT key.
Power save mode : OSD is only displayed by pressing the PROCEED key.

To exit aging mode, take one of the following actions:

1) Press the EXIT key twice.
2) Press the EXIT key once. After about 30 seconds, the OSD goes off.
3) Turn the power off.

2-4. Input Signal

See Section 3.

2-5. Connection method

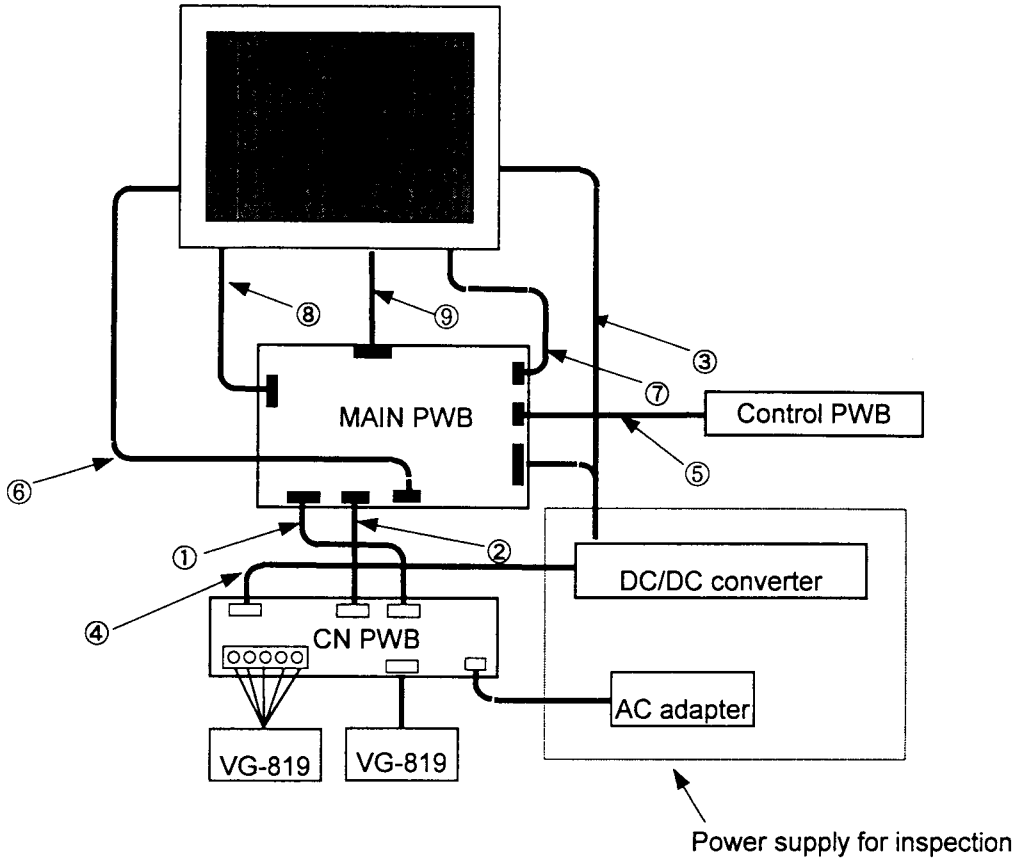


Figure 4 The set adjustment connection figure

LCD Back Panel views

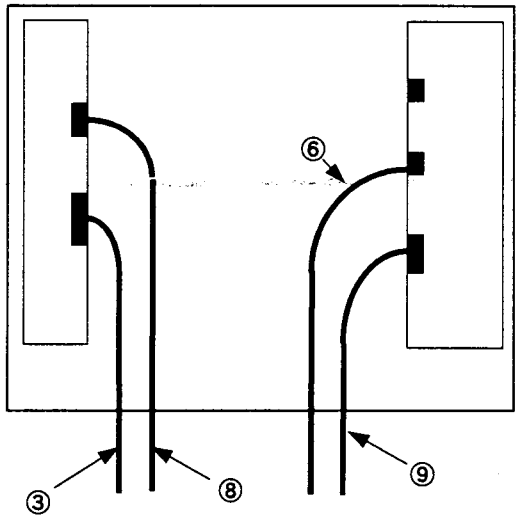


Figure 5 The LCD panel connection back figure

① Video cable
② Signal cable(For JIG)
③ Power cable
④ DC-CN cable
⑤ OSD cable
⑥ Contrast cable
⑦ Control cable
⑧ Inverter cable
⑨ LCD cable

2-6. Power-on and Signal Input

① Turn the LCD's power on (VG-819 off) and check that the LED is amber. At the first power-on after the board is assembled, the LED lights yellow after about 1 minute because it takes time to initialize the board.

② Set to BNC on the BNC/D-SUB switch and make sure "BNC" is displayed on the OSD.
This switch changes between BNC and D-SUB with every push.

③ Turn the VG-819 on and check that the LED color turns from amber to green.
* The product is defective if the LED does not turn green.

④ Before adjustment, always execute "FACTORY RESET" as follows:
1) Display the OSD and TOOL TAB( ) "ALL RESET" and push PROCEED key. After that, factory reset is executed by pushing RESET key.

2-7. Adjustment

2-7-1. Video Reference adjustment

Note: A special CN14 with pin 11 cable is required for this adjustment.

① Set the VG-819 to signal 2 output with BNC.

② Display OSD service mode as follows and execute Video Reference adjustment.

1) Press any key expect BNC and RESET key to display the OSD menu screen.

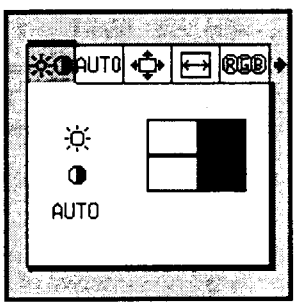


Figure 6

2) Press the ◀ (left) or ▶ (right) keys to display the Information screen.

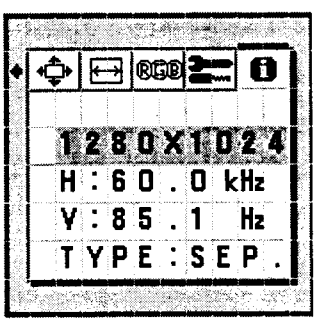


Figure 7

3) While holding down the RESET key, press the ◀ (left) and ▶ (right) keys together, to display "WARNING", and press PROCEED key to enter the service menu.

4) Position the cursor bar on "RGB Reference" in the OSM with the ▲ (up) or ▼ (down) key and press the PROCEED key to display the corresponding RGB Reference adjustment screen.

5) Position the cursor bar on "REF0.7" in the OSM with the ▲ (up) or ▼ (down) key and press the PROCEED key. OSD is adjusted normally at this time if 115 - 120 values are displayed in each of RGB of R/G/B in the menu of RGB0.7 if 115 - 120 .

6) Position the cursor bar on "USER" in the OSM with the ▲ (up) or ▼ (down) key and press the PROCEED key. OSD is normally at this time if 115 - 120 values are displayed in each of the paragraph of USER after disappearing momentarily and OSD is displayed once again.

2-7-2. Auto adjust delay adjustment

This adjustment will be set to best position for H-sync Delay.

① Receive signal 3 through the BNC.
② Position the cursor bar on "Fine Delay" in the OSM with the ▲ (UP), ▼ (DOWN) key and push PROCEED key.
"Fine Delay" appears on the OSD.

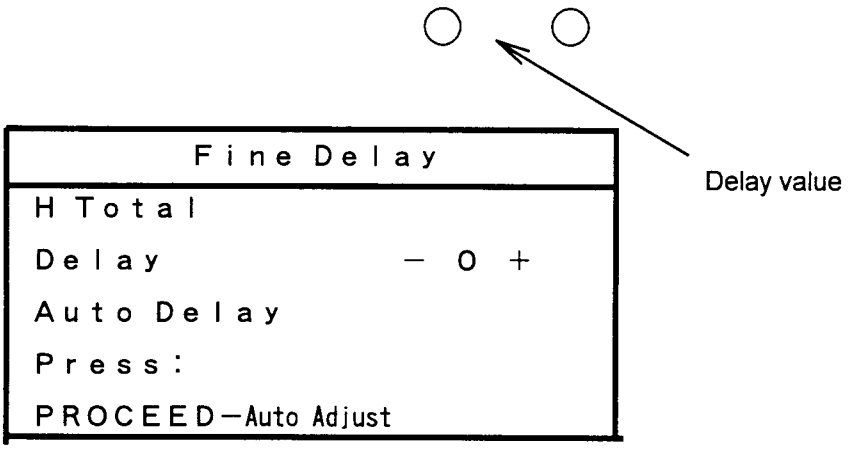


Figure8 Fine Delay Screen

③ While holding down the PROCEED key for 5 seconds, then the value of Auto Delay change.
④ Adjust the value of high frequency by the PROCEED key.

Note: This value must be 1 to 20.

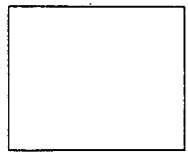
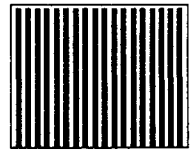
⑤ Position the cursor bar on "Delay" and adjust focus with ◀ (−) or ▶ (+) so that the delay value is most dark of screen.

This delay value must be between over than 0.

⑥ When adjustment is finished, push the EXIT key 4 times to exit service mode.
⑦ Make sure that the LED turns green .

2.8. Input Video Signal

For VG-819

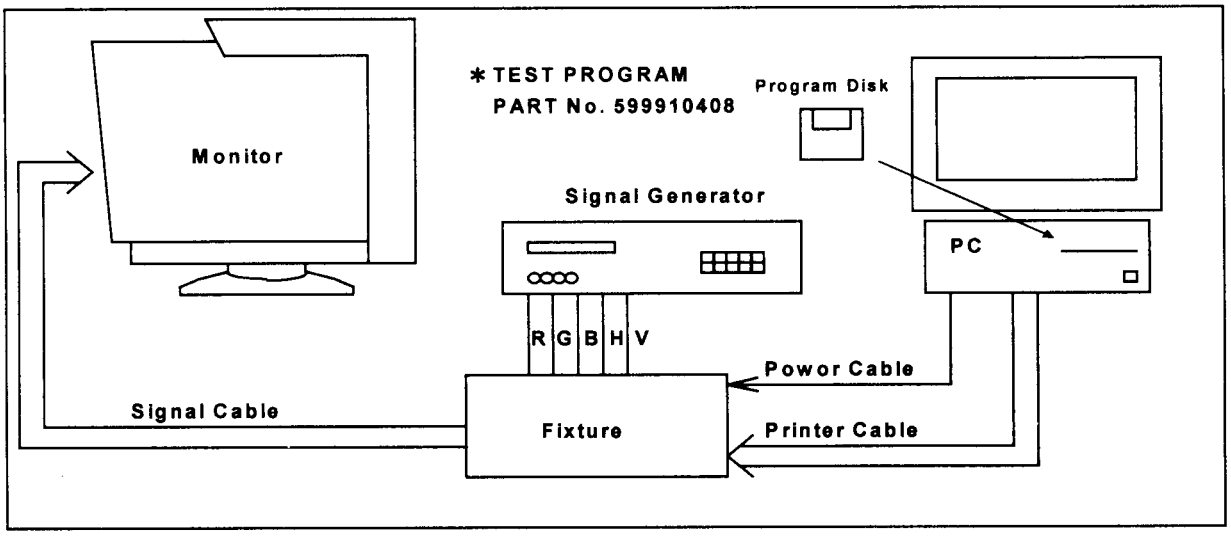
			VG-819		
Mode			Signal 1	Signal 2	Signal 3
H	DOT CLOCK	[MHz]	135.00		
	TOTAL	[DOT]	1688		
	DISP	[DOT]	1280		
	SYNC PULSE	[DOT]	112		
	BACK	[DOT]	248		
	HDstrat	[DOT]	0		
	HDwidth	[DOT]	0		
V	INTERLACE		NON		
	TOTAL	[H]	1066		
	DISP	[H]	1024		
	SYNC PULSE	[H]	3		
	BACK PORCH	[H]	38		
	EQPfp	[H]	0		
	EQPbp	[H]	0		
	SERRATION	[H]	OFF		
	EDP	[H]	OFF		
	VDs	[H]	0		
	VBf	[H]	0		
OUTPUT	OUTPUT MODE		ANALOG		
	NRZ/RZ		NRZ		
	CV				
	HS		NEG		
	VS		NEG		
	CS		NEG		
	HD		NEG		
	VD		NEG		
	RGB		POS		
	HT		POS		
	C		NEG		
	VIDEO		0.70		
	Set-up		OFF		
	Sync		0.3		
GRAY	Direction:0		L0:0, L1:17, L2:34, L3:51, L4:68, L5:85, L6:102, L7:127, L8:143, L9:159, L10:175, L11:191, L12:207, L13:223, L14:239, L15:255	 All white	 Stripe(1dot) and the square

INSPECTION

1. Inspection of PLUG & PLAY communication

1-1. A construction of System

This system should be connected as shown below.



1-2. Starting method

1) Input Signal

Input signal must be separate sync and two kinds of signals must be prepared.

One is the signal with vertical synchronization frequency of 42Hz, and another is the signal with vertical synchronization frequency of between 55Hz and 25kHz. Horizontal synchronization frequency should be set to reasonable value(example 31.5kHz).

2) Power ON procedure

- Power on PC and put the floppy disk for PnP Inspection into PC.
- Turn on Fixture.
- Make sure that fixture's LED flashes on and off.
- Turn on signal generator and monitor.

3) Starting PC Software

- Inspection of PnP communication

  To check the PnP communication for LCD1810, EDID file name is LCD1810.

  Type "P LCD1810" on DOS command line and press return key.
- Writing EDID to EEPROM and inspection of PnP communication

  To write EDID to EEPROM and check the PnP communication of LCD1810, type

  "WP LCD1810" on DOS command line and press return key.

1-3. Operation

- The operation should be performed according to the screen message.
- When the message of "Please input Serial Number ." is displayed, type a serial number and hit return key. The message of "Input Serial Number is OK ?" is displayed. If the serial number is correct, press Y key, otherwise press N key and input the correct serial number. If you pressed Y key, the EDID data in which the serial number was edited is displayed. Check the data and press N key.
- When the message of "Please set Vsync to 42Hz." is displayed, set the signal generator to the signal with the vertical synchronization frequency of 42Hz. When the message of "Please set Vsync to over 55Hz." is displayed, set the signal generator to the signal with vertical synchronization frequency of between 55Hz and 25kHz.
- The message of "Normally Complete" means that the writing EDID data or PnP inspection was completed normally. "Error" message means that the writing EDID data or PnP inspection did not process correctly.
- When the PnP inspection is complete EDID data would be displayed and if the read EDID data differ from the original EDID data, the different bytes would be displayed in red.
- For the details of error messages, see the message displayed at the bottom right on the screen. The explanations of the messages are shown on section 4.
- After writing EDID data or inspection of DDC2B, monitor can not be communicated by DDC1. In this case, turn the monitor off and on. The DDC1 communication check can be performed again.
- Make sure that fixture's LED flashes on and off before writing EDID data and inspecting DDC1 and DDC2B. If the fixture's LED does not flash on and off, turn the monitor and the fixture off and then power them on again.

1-4. Error Messages

- **Start Bit Error**

  This message is displayed when the start bit is not "H" while sending data from PC to MPU on the fixture. This error will be caused by noise etc. on the line.
- **Command Error**

  This message is displayed when the different command is sent from PC to MPU on the fixture.
- **Hardware Error**

  This message means that the PC didn't recognize ACK command sent from the MPU on the fixture.
- **File Open Error**

  This message means that the input EDID file name is wrong.
- **Command line Switch Error**

  This message means that the input communication command is wrong.
- **Parity Error**

  This message is displayed when the MPU on the fixture recognized that the parity bit is incorrect. This error will be caused by noise etc. on the line.

· **EDID Data Error**

This message is displayed when the null bit was not detected in EDID data read by DDC1 communication.

· **EDID Data Sort Error**

This message is displayed when the header code was not detected in EDID data read by DDC1 communication.

· **Time Out Error**

This message is displayed when the PC did not recognize ACK commands sent from MPU within 10 msec after PC had sent communication command or EDID data.

If this error occurred, check the connection on PC, fixture, and monitor.

· **Data length is too short**

This message is displayed when the input serial number is incomplete.

· **Data length is too long**

This message is displayed when the input serial number has excessive numbers or letters.

1-5. EDID data file

An example of the EDID data file text is shown below. When you write or inspect EDID for a new monitor model that does not have a data file, create its data file according to the format shown below by using an editor software and save the file in an appropriate name to the floppy disk for PnP Inspection.

file name : LCD1810

Table 1-5. Data list (Management number : EDID-105)

\	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	38	A3	86	47	01	01	01	01
10	20	08	01	01	0E	24	1D	78	E8	3C	82	9C	56	51	99	25
20	18	4E	4F	BF	EF	00	31	59	45	59	81	80	81	40	01	01
30	01	01	01	01	01	01	30	2A	00	98	51	00	2A	40	30	70
40	13	00	67	1F	11	00	00	1E	00	00	00	FD	00	38	4C	18
50	50	0D	00	0A	20	20	20	20	20	20	00	00	00	FC	00	4E
60	45	43	20	4C	43	44	31	38	31	30	0A	20	00	00	00	FF
70	00	37	36	30	30	30	30	30	52	41	0A	20	20	20	00	86

※1 : address 10h Week of manufacture=Month of manufacture x 4

※2 : address 11h Year of manufacture - 1990

※3 : address 71h ~ 7Dh Serial number (ASCII code)

If less than 13 char, terminate with 0Ah and fill the rests with 20h.

※4 : address 7Fh Checksum

The sum of entire 128 byte shall be equal to 00h.

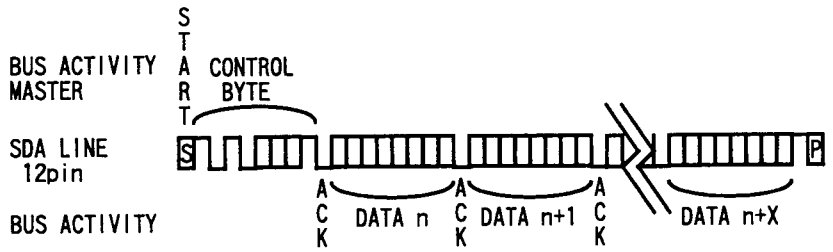


Diagram 1-5 Timing chart of DDC2B

TROUBLE SHOOTING

Refer to the User's Manual trouble shooting section before using this chart.

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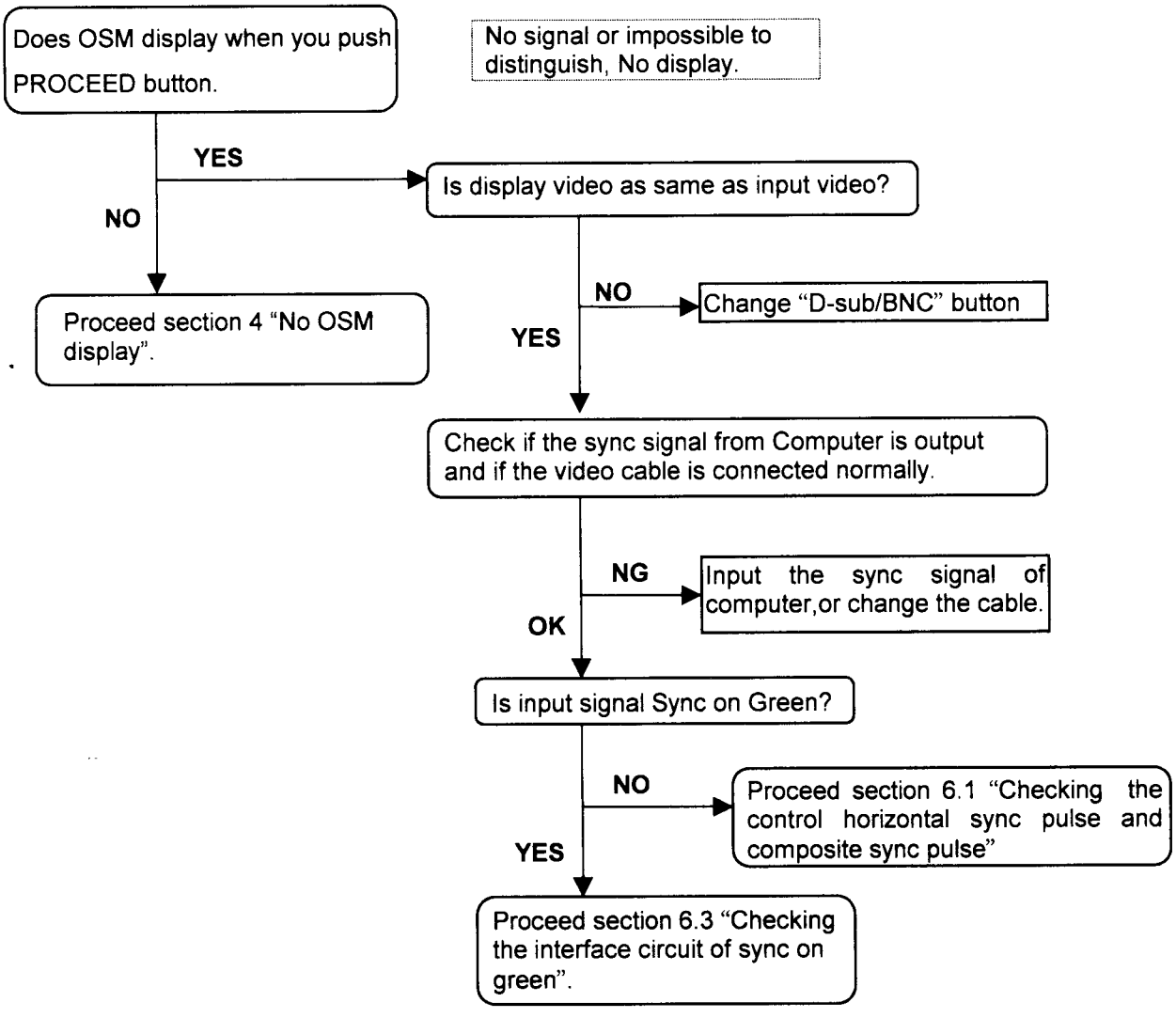
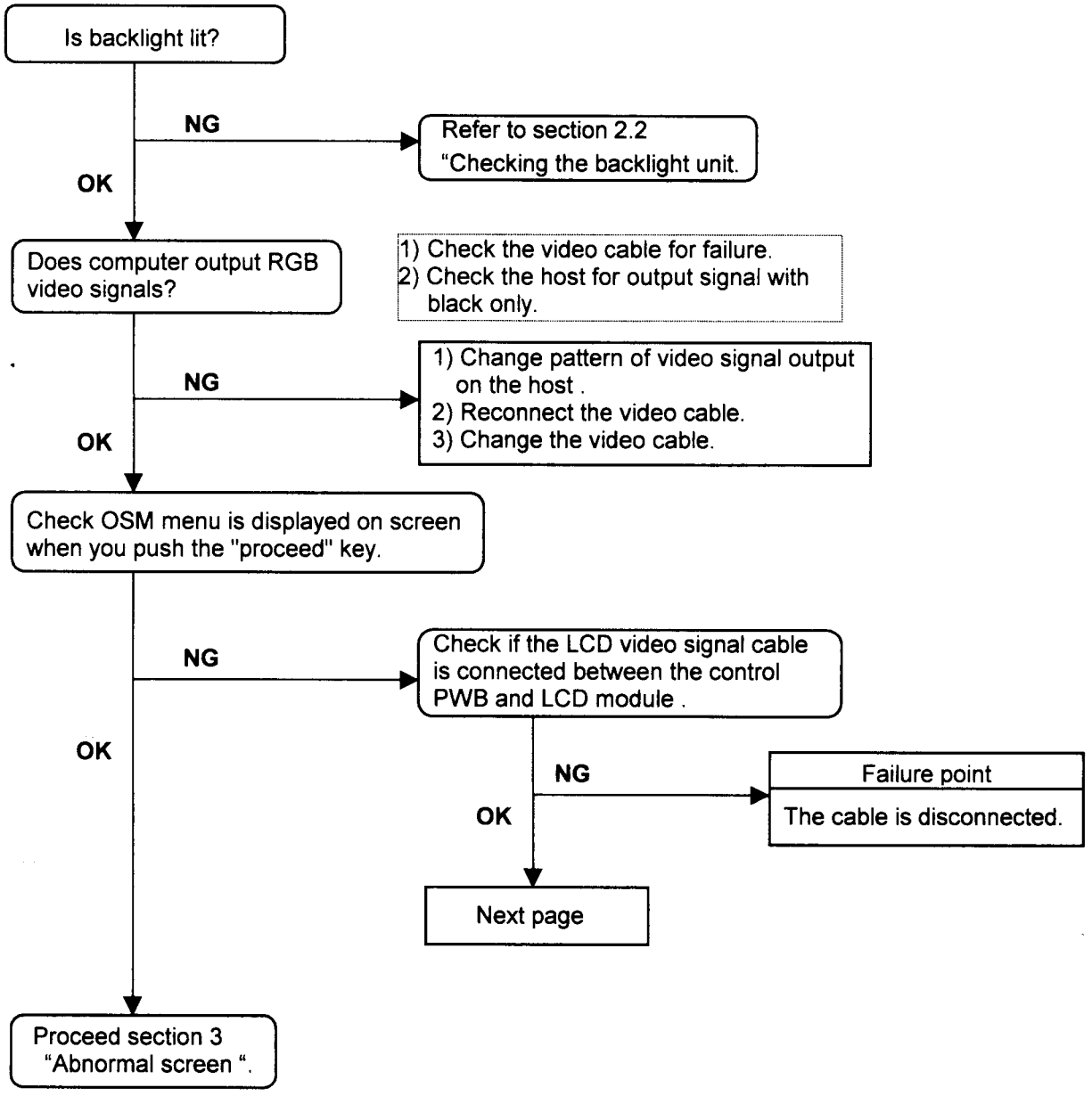
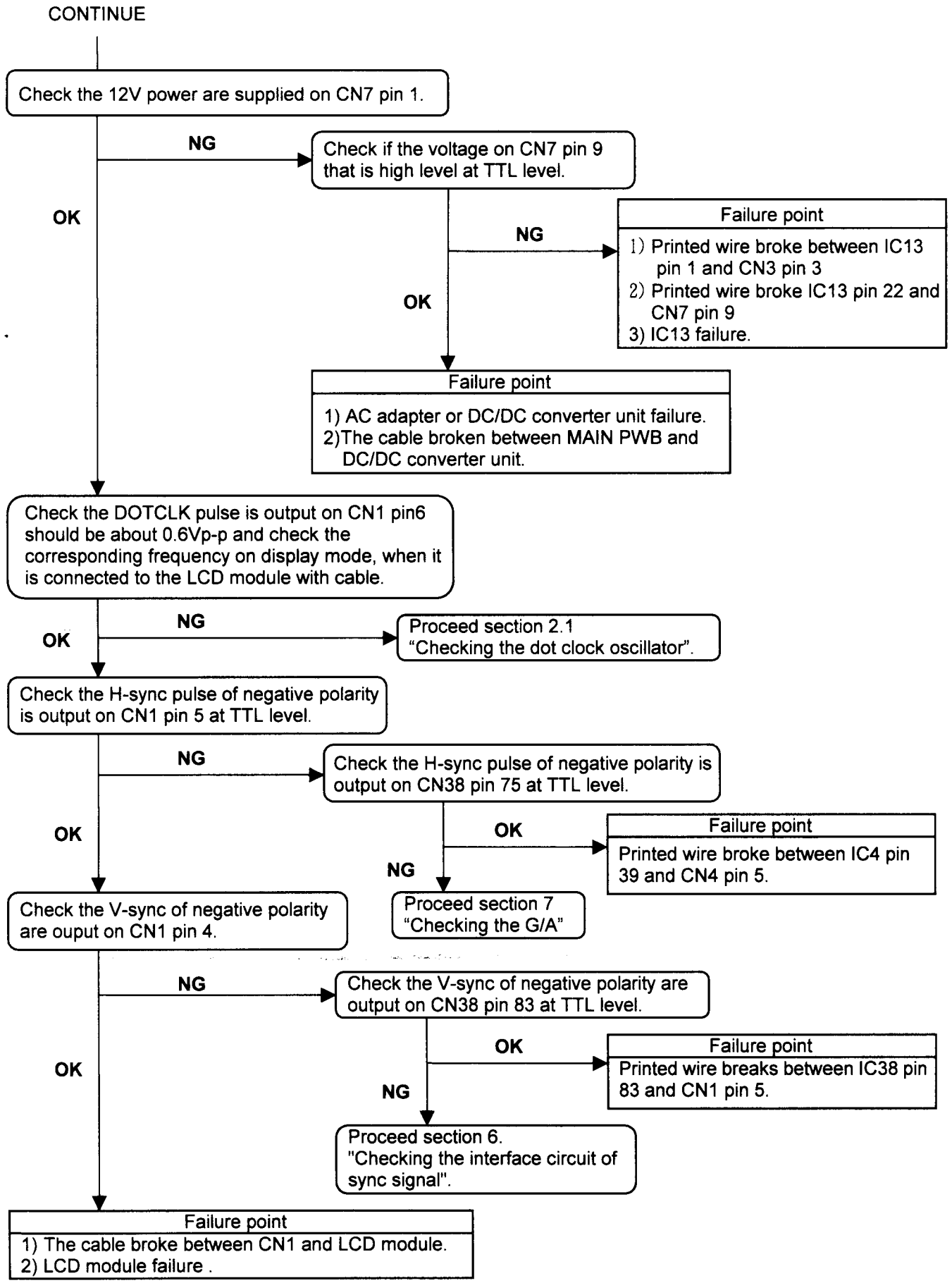
1. NO DISPLAY OF SCREEN (Screen is black, color of LED is amber)

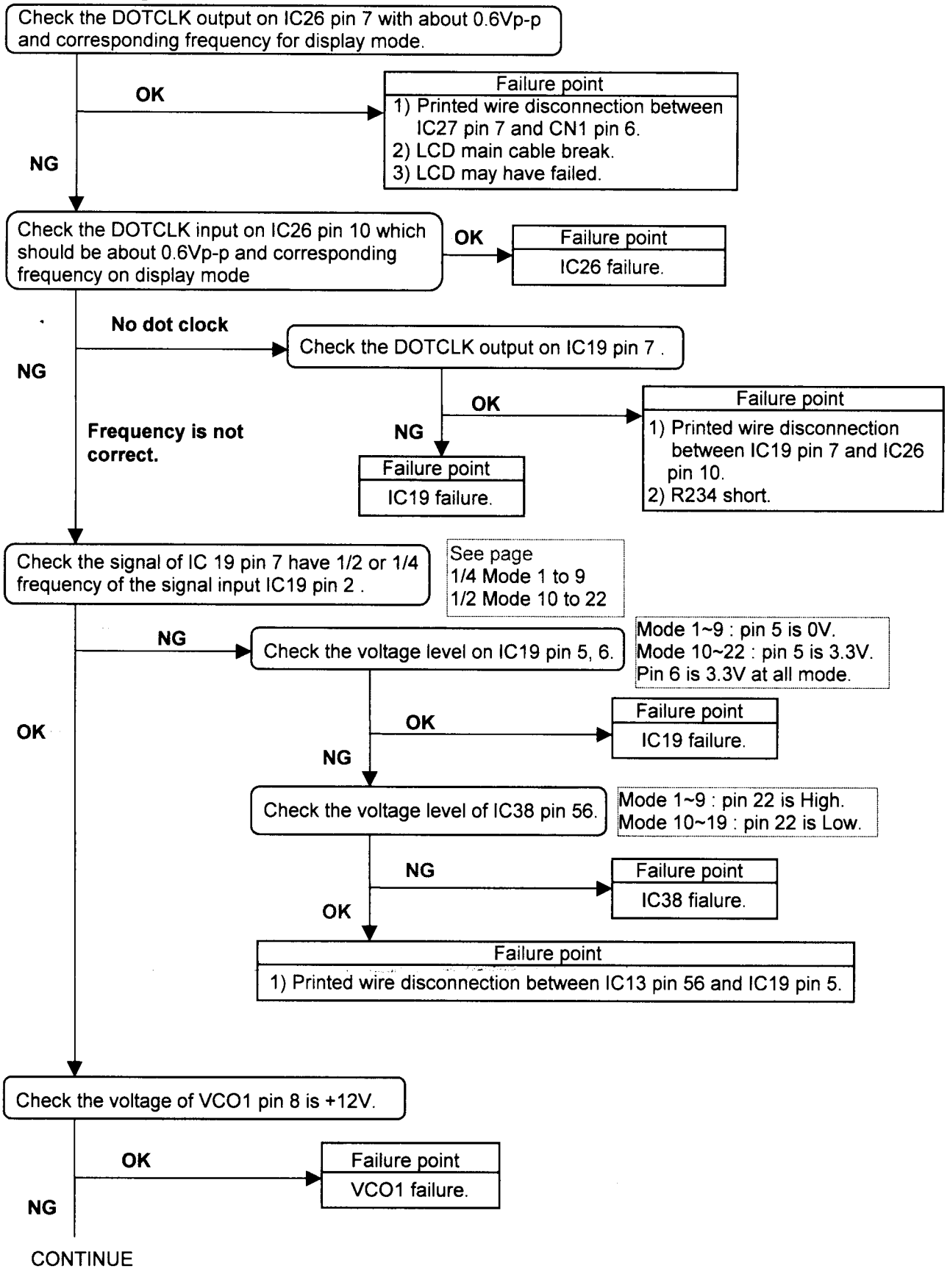

Does OSM display when you push PROCEED button.
No signal or impossible to distinguish, No display.
YES
NO
Is display video as same as input video?
Proceed section 4 "No OSM display".
NO
Change "D-sub/BNC" button
YES
Check if the sync signal from Computer is output and if the video cable is connected normally.
NG
Input the sync signal of computer,or change the cable.
OK
Is input signal Sync on Green?
NO
Proceed section 6.1 "Checking the control horizontal sync pulse and composite sync pulse"
YES
Proceed section 6.3 "Checking the interface circuit of sync on green".

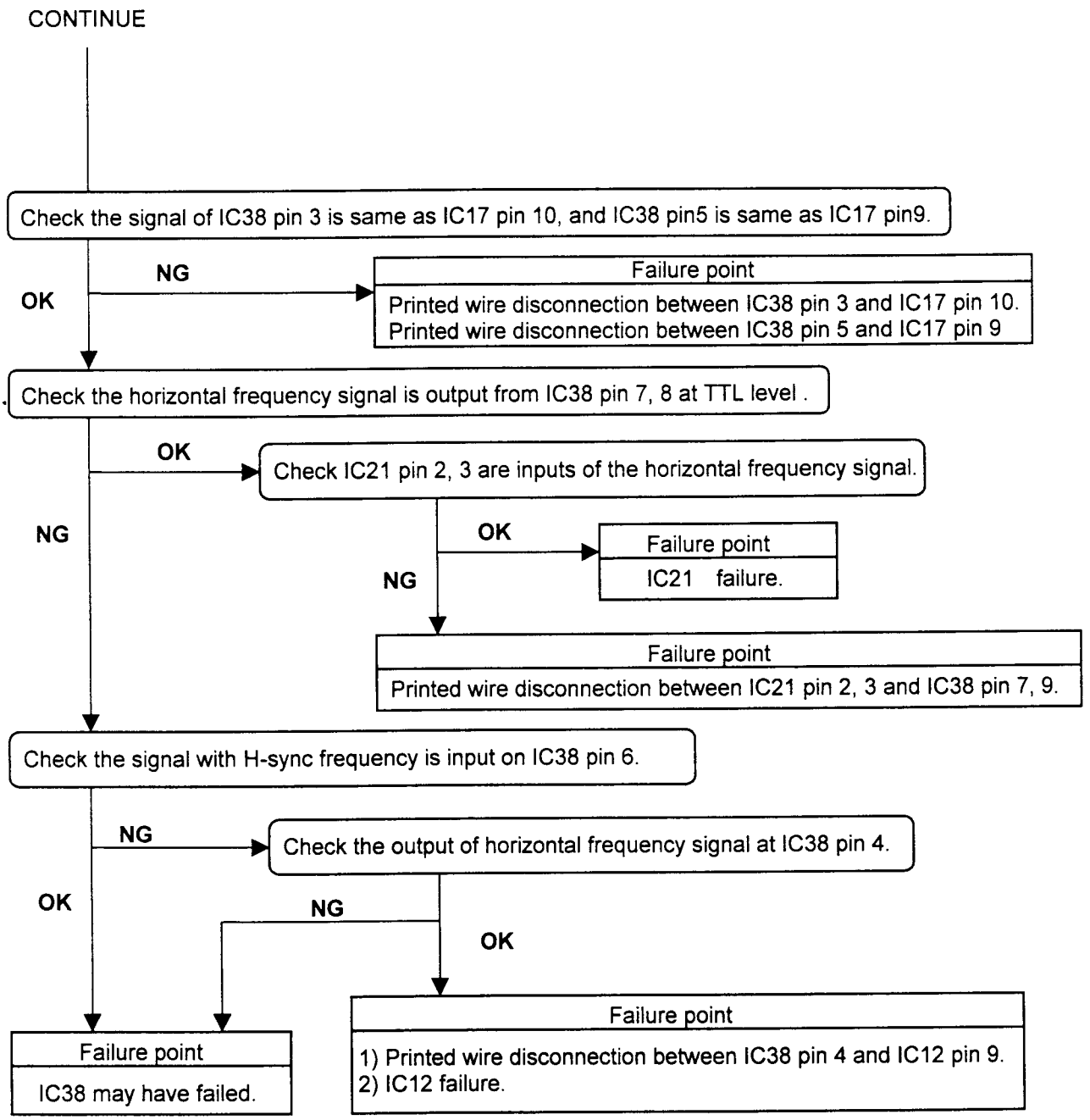
2. Nothing displays on screen. (Screen is black, color of LED is green)


Is backlight lit?
NG
Refer to section 2.2 "Checking the backlight unit.
OK
Does computer output RGB video signals?
1) Check the video cable for failure.
2) Check the host for output signal with black only.
NG
1) Change pattern of video signal output on the host .
2) Reconnect the video cable.
3) Change the video cable.
OK
Check OSM menu is displayed on screen when you push the "proceed" key.
NG
Check if the LCD video signal cable is connected between the control PWB and LCD module .
OK
NG
Failure point
The cable is disconnected.
OK
Next page
Proceed section 3 "Abnormal screen ".

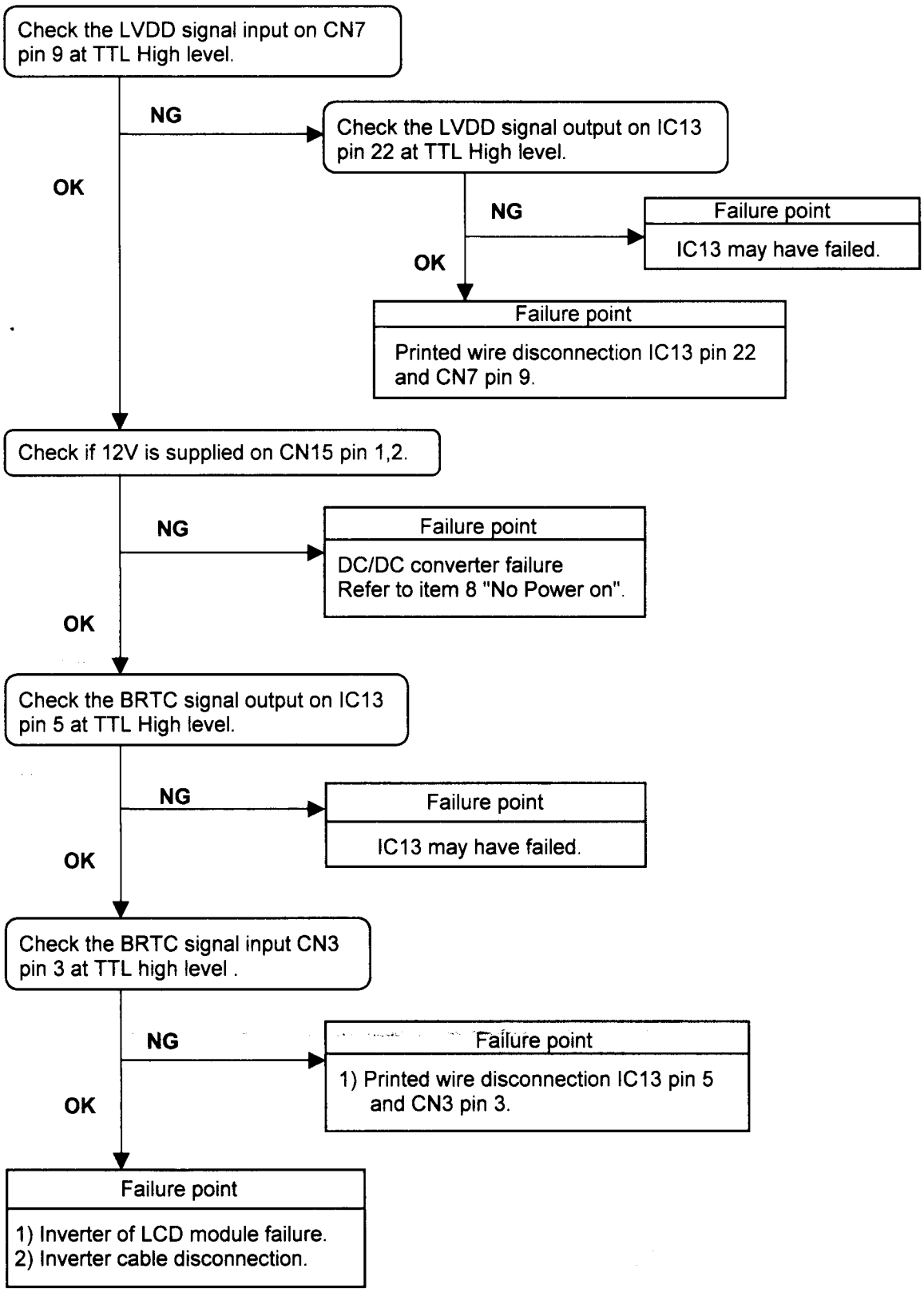

CONTINUE
Check the 12V power are supplied on CN7 pin 1.
NG
Check if the voltage on CN7 pin 9 that is high level at TTL level.
OK
NG
Failure point
1) Printed wire broke between IC13 pin 1 and CN3 pin 3
2) Printed wire broke IC13 pin 22 and CN7 pin 9
3) IC13 failure.
OK
Failure point
1) AC adapter or DC/DC converter unit failure.
2)The cable broken between MAIN PWB and DC/DC converter unit.
Check the DOTCLK pulse is output on CN1 pin6 should be about 0.6Vp-p and check the corresponding frequency on display mode, when it is connected to the LCD module with cable.
OK
NG
Proceed section 2.1 "Checking the dot clock oscillator".
Check the H-sync pulse of negative polarity is output on CN1 pin 5 at TTL level.
NG
Check the H-sync pulse of negative polarity is output on CN38 pin 75 at TTL level.
OK
OK
Failure point
Printed wire broke between IC4 pin 39 and CN4 pin 5.
NG
Check the V-sync of negative polarity are ouput on CN1 pin 4.
Proceed section 7 "Checking the G/A"
NG
Check the V-sync of negative polarity are output on CN38 pin 83 at TTL level.
OK
OK
Failure point
Printed wire breaks between IC38 pin 83 and CN1 pin 5.
NG
Proceed section 6. "Checking the interface circuit of sync signal".
Failure point
1) The cable broke between CN1 and LCD module.
2) LCD module failure .

2.1 Checking the dot clock oscillator

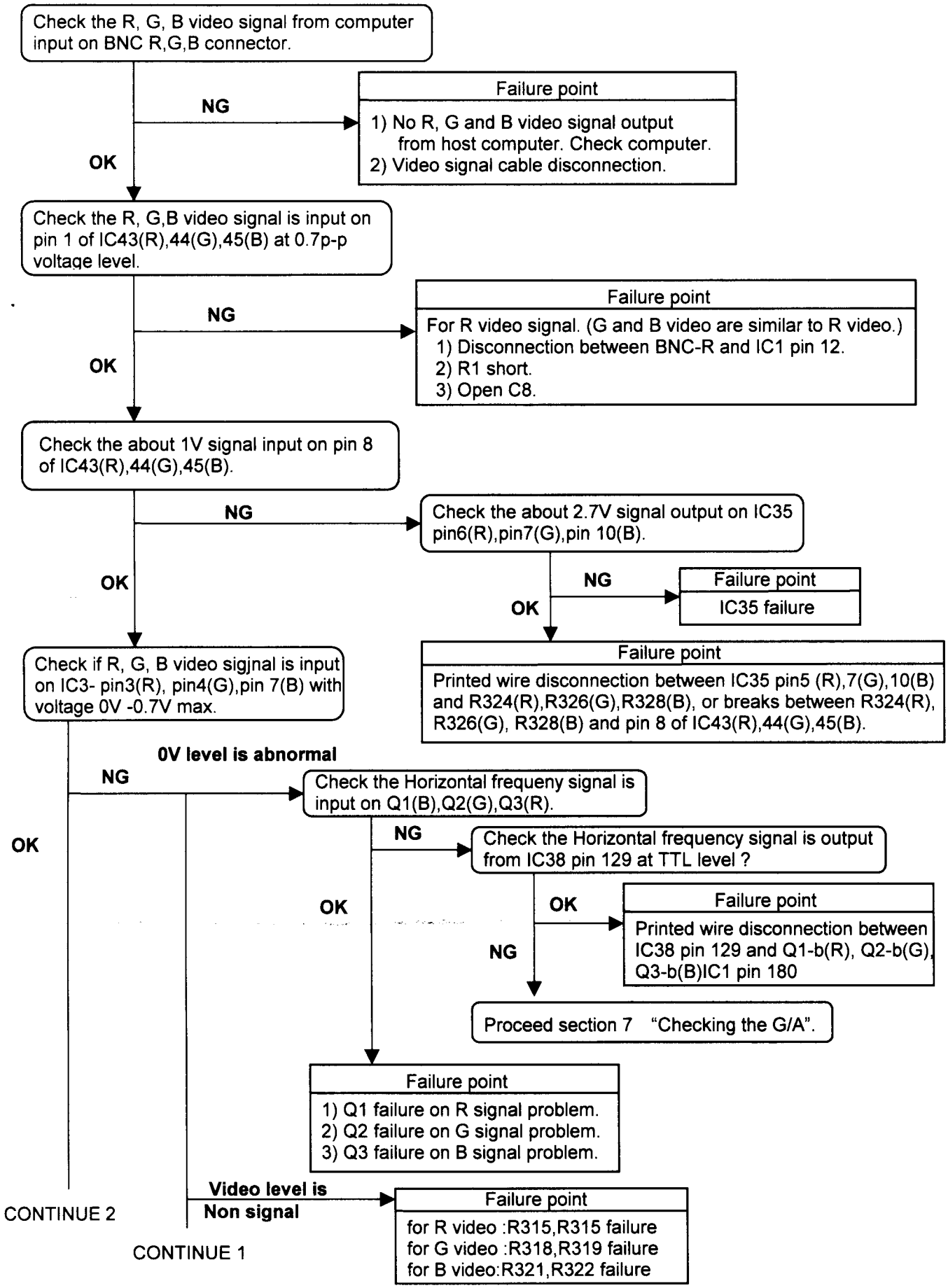

Check the DOTCLK output on IC26 pin 7 with about 0.6Vp-p and corresponding frequency for display mode.
OK
Failure point
1) Printed wire disconnection between IC27 pin 7 and CN1 pin 6.
2) LCD main cable break.
3) LCD may have failed.
NG
Check the DOTCLK input on IC26 pin 10 which should be about 0.6Vp-p and corresponding frequency on display mode
OK
Failure point
IC26 failure.
No dot clock
NG
Check the DOTCLK output on IC19 pin 7 .
OK
Failure point
1) Printed wire disconnection between IC19 pin 7 and IC26 pin 10.
2) R234 short.
Frequency is not correct.
NG
Failure point
IC19 failure.
Check the signal of IC 19 pin 7 have 1/2 or 1/4 frequency of the signal input IC19 pin 2 .
See page
1/4 Mode 1 to 9
1/2 Mode 10 to 22
NG
Check the voltage level on IC19 pin 5, 6.
Mode 1~9 : pin 5 is 0V.
Mode 10~22 : pin 5 is 3.3V.
Pin 6 is 3.3V at all mode.
OK
OK
Failure point
IC19 failure.
NG
Check the voltage level of IC38 pin 56.
Mode 1~9 : pin 22 is High.
Mode 10~19 : pin 22 is Low.
NG
Failure point
IC38 fialure.
OK
Failure point
1) Printed wire disconnection between IC13 pin 56 and IC19 pin 5.
Check the voltage of VCO1 pin 8 is +12V.
OK
Failure point
VCO1 failure.
NG
CONTINUE

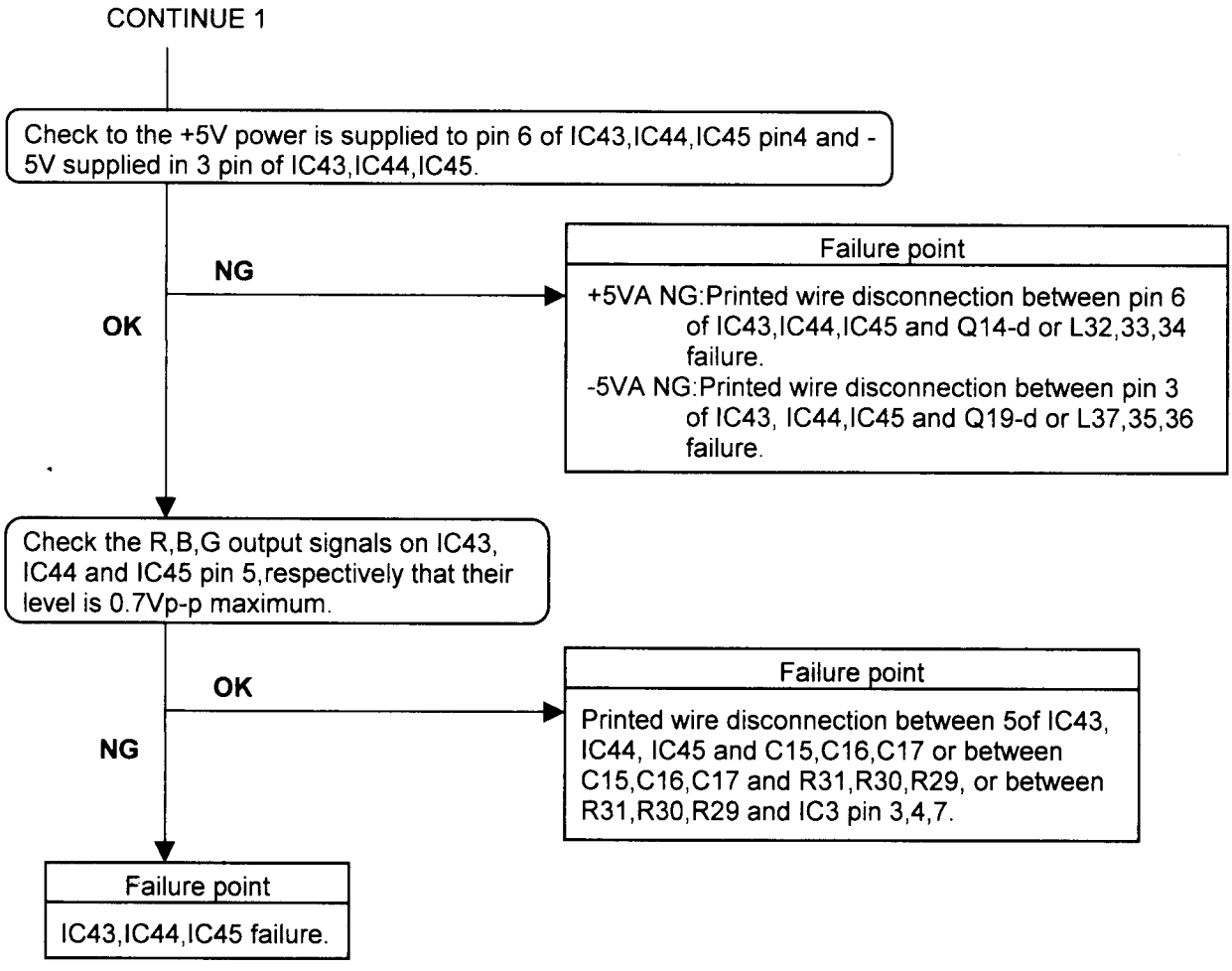

CONTINUE
Check the signal of IC38 pin 3 is same as IC17 pin 10, and IC38 pin5 is same as IC17 pin9.
NG
OK
Failure point
Printed wire disconnection between IC38 pin 3 and IC17 pin 10.
Printed wire disconnection between IC38 pin 5 and IC17 pin 9
Check the horizontal frequency signal is output from IC38 pin 7, 8 at TTL level .
OK
Check IC21 pin 2, 3 are inputs of the horizontal frequency signal.
NG
OK
Failure point
IC21 failure.
NG
Failure point
Printed wire disconnection between IC21 pin 2, 3 and IC38 pin 7, 9.
Check the signal with H-sync frequency is input on IC38 pin 6.
NG
Check the output of horizontal frequency signal at IC38 pin 4.
OK
NG
OK
Failure point
IC38 may have failed.
Failure point
1) Printed wire disconnection between IC38 pin 4 and IC12 pin 9.
2) IC12 failure.

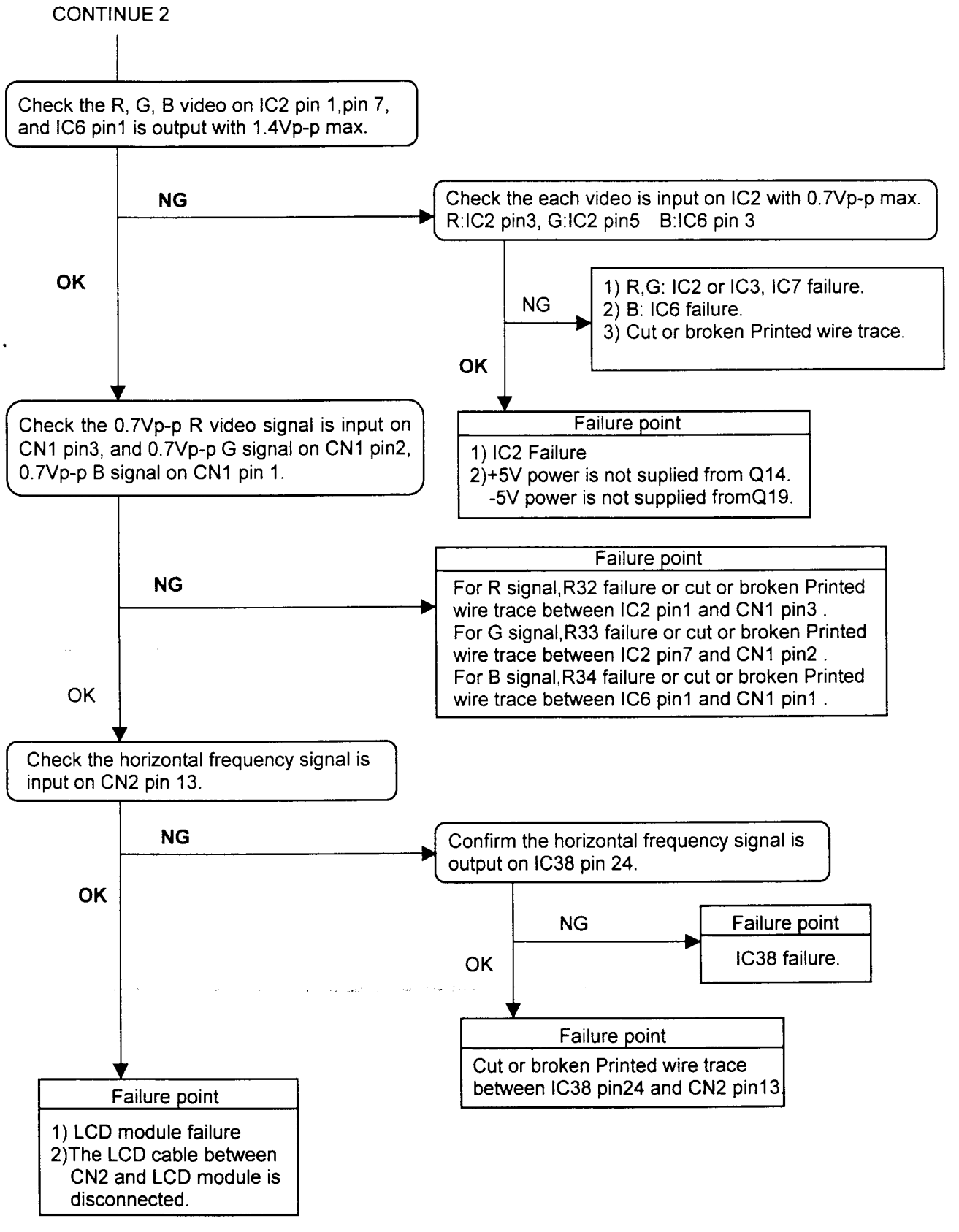
2.2 Checking the backlight unit


Check the LVDD signal input on CN7 pin 9 at TTL High level.
NG
Check the LVDD signal output on IC13 pin 22 at TTL High level.
OK
NG
Failure point
IC13 may have failed.
OK
Failure point
Printed wire disconnection IC13 pin 22 and CN7 pin 9.
Check if 12V is supplied on CN15 pin 1,2.
NG
Failure point
DC/DC converter failure
Refer to item 8 "No Power on".
OK
Check the BRTC signal output on IC13 pin 5 at TTL High level.
NG
Failure point
IC13 may have failed.
OK
Check the BRTC signal input CN3 pin 3 at TTL high level .
NG
Failure point
1) Printed wire disconnection IC13 pin 5 and CN3 pin 3.
OK
Failure point
1) Inverter of LCD module failure.
2) Inverter cable disconnection.

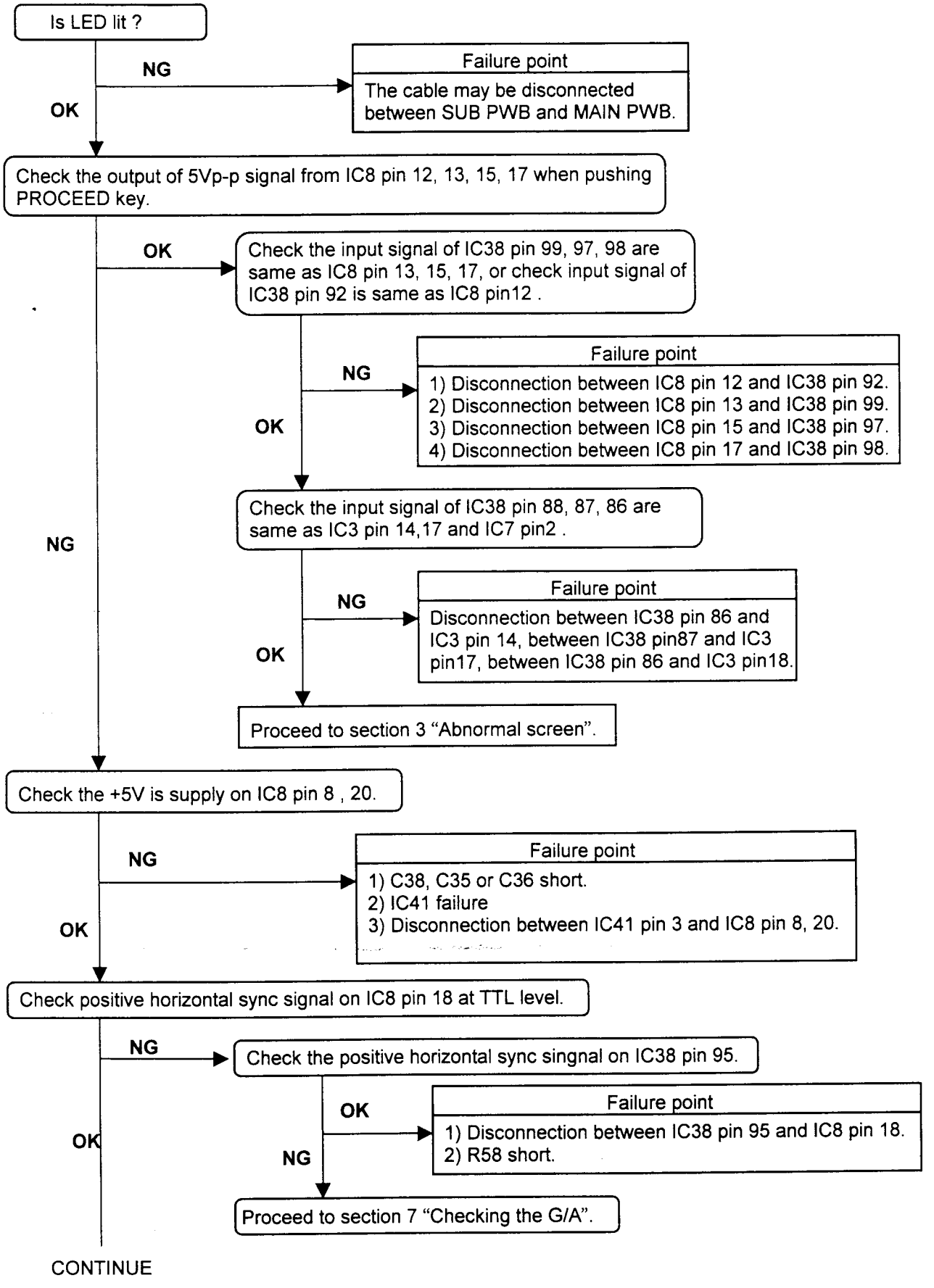
3. Abnormal screen

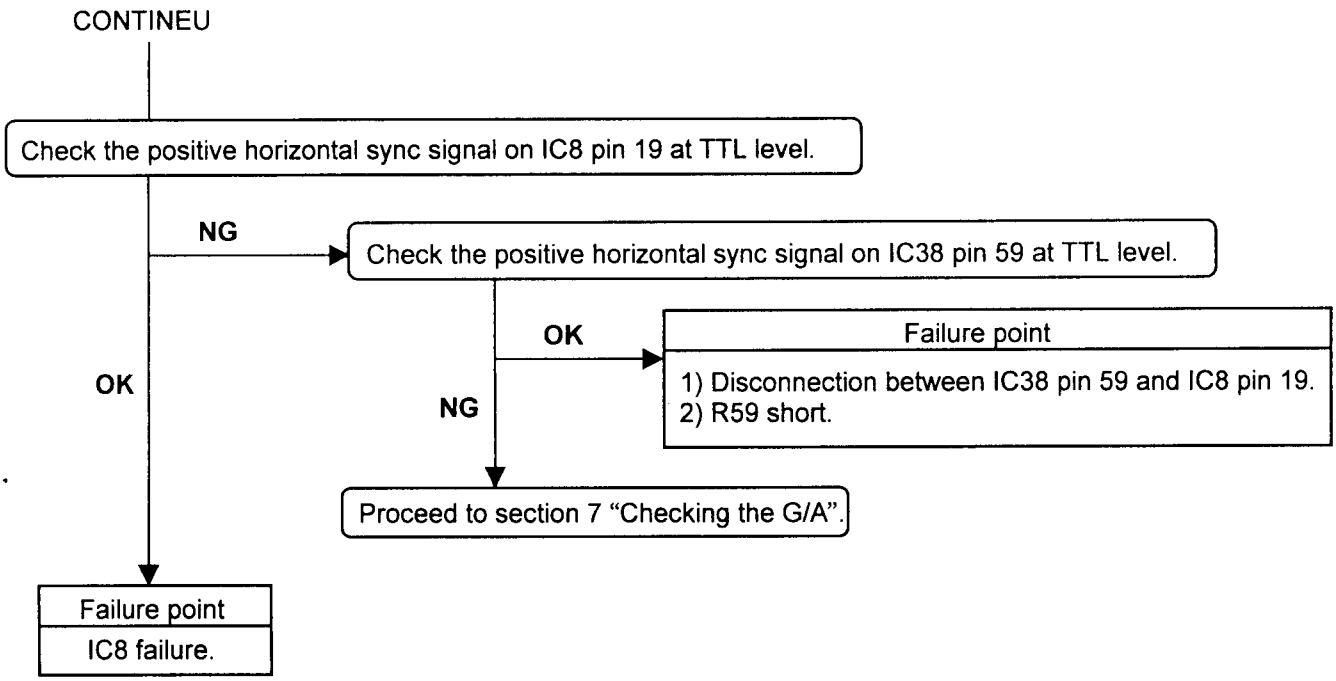

Check the R, G, B video signal from computer input on BNC R,G,B connector.
NG
Failure point
1) No R, G and B video signal output from host computer. Check computer.
2) Video signal cable disconnection.
OK
Check the R, G,B video signal is input on pin 1 of IC43(R),44(G),45(B) at 0.7p-p voltage level.
NG
Failure point
For R video signal. (G and B video are similar to R video.)
1) Disconnection between BNC-R and IC1 pin 12.
2) R1 short.
3) Open C8.
OK
Check the about 1V signal input on pin 8 of IC43(R),44(G),45(B).
NG
Check the about 2.7V signal output on IC35 pin6(R),pin7(G),pin 10(B).
NG
Failure point
IC35 failure
OK
OK
Check if R, G, B video sigjnal is input on IC3- pin3(R), pin4(G),pin 7(B) with voltage 0V -0.7V max.
Failure point
Printed wire disconnection between IC35 pin5 (R),7(G),10(B) and R324(R),R326(G),R328(B), or breaks between R324(R), R326(G), R328(B) and pin 8 of IC43(R),44(G),45(B).
0V level is abnormal
NG
Check the Horizontal frequeny signal is input on Q1(B),Q2(G),Q3(R).
OK
NG
Check the Horizontal frequency signal is output from IC38 pin 129 at TTL level ?
OK
OK
Failure point
Printed wire disconnection between IC38 pin 129 and Q1-b(R), Q2-b(G), Q3-b(B)IC1 pin 180
NG
Proceed section 7 "Checking the G/A".
Failure point
1) Q1 failure on R signal problem.
2) Q2 failure on G signal problem.
3) Q3 failure on B signal problem.
Video level is
Non signal
Failure point
for R video :R315,R315 failure
for G video :R318,R319 failure
for B video:R321,R322 failure
CONTINUE 2
CONTINUE 1


CONTINUE 1
Check to the +5V power is supplied to pin 6 of IC43,IC44,IC45 pin4 and -5V supplied in 3 pin of IC43,IC44,IC45.
NG
OK
Failure point
+5VA NG:Printed wire disconnection between pin 6 of IC43,IC44,IC45 and Q14-d or L32,33,34 failure.
-5VA NG:Printed wire disconnection between pin 3 of IC43, IC44,IC45 and Q19-d or L37,35,36 failure.
Check the R,B,G output signals on IC43, IC44 and IC45 pin 5,respectively that their level is 0.7Vp-p maximum.
OK
NG
Failure point
Printed wire disconnection between 5of IC43, IC44, IC45 and C15,C16,C17 or between C15,C16,C17 and R31,R30,R29, or between R31,R30,R29 and IC3 pin 3,4,7.
Failure point
IC43,IC44,IC45 failure.

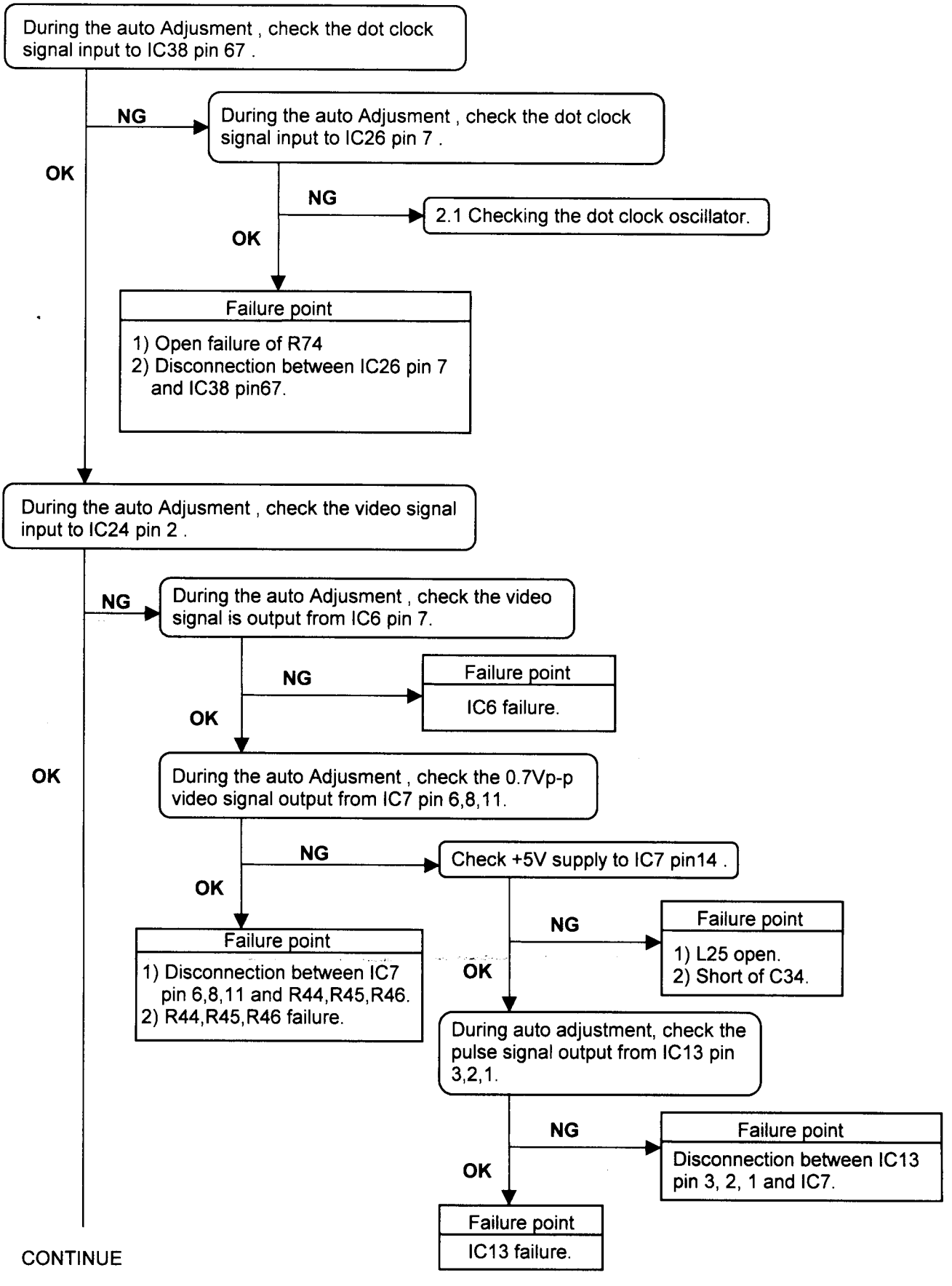

CONTINUE 2
Check the R, G, B video on IC2 pin 1,pin 7, and IC6 pin1 is output with 1.4Vp-p max.
NG
Check the each video is input on IC2 with 0.7Vp-p max.
R:IC2 pin3, G:IC2 pin5 B:IC6 pin 3
OK
NG
1) R,G: IC2 or IC3, IC7 failure.
2) B: IC6 failure.
3) Cut or broken Printed wire trace.
OK
Failure point
1) IC2 Failure
2)+5V power is not suplied from Q14.
-5V power is not supplied fromQ19.
Check the 0.7Vp-p R video signal is input on CN1 pin3, and 0.7Vp-p G signal on CN1 pin2, 0.7Vp-p B signal on CN1 pin 1.
NG
Failure point
For R signal,R32 failure or cut or broken Printed wire trace between IC2 pin1 and CN1 pin3 .
For G signal,R33 failure or cut or broken Printed wire trace between IC2 pin7 and CN1 pin2 .
For B signal,R34 failure or cut or broken Printed wire trace between IC6 pin1 and CN1 pin1 .
OK
Check the horizontal frequency signal is input on CN2 pin 13.
NG
Confirm the horizontal frequency signal is output on IC38 pin 24.
OK
NG
Failure point
IC38 failure.
OK
Failure point
Cut or broken Printed wire trace between IC38 pin24 and CN2 pin13.
Failure point
1) LCD module failure
2)The LCD cable between CN2 and LCD module is disconnected.

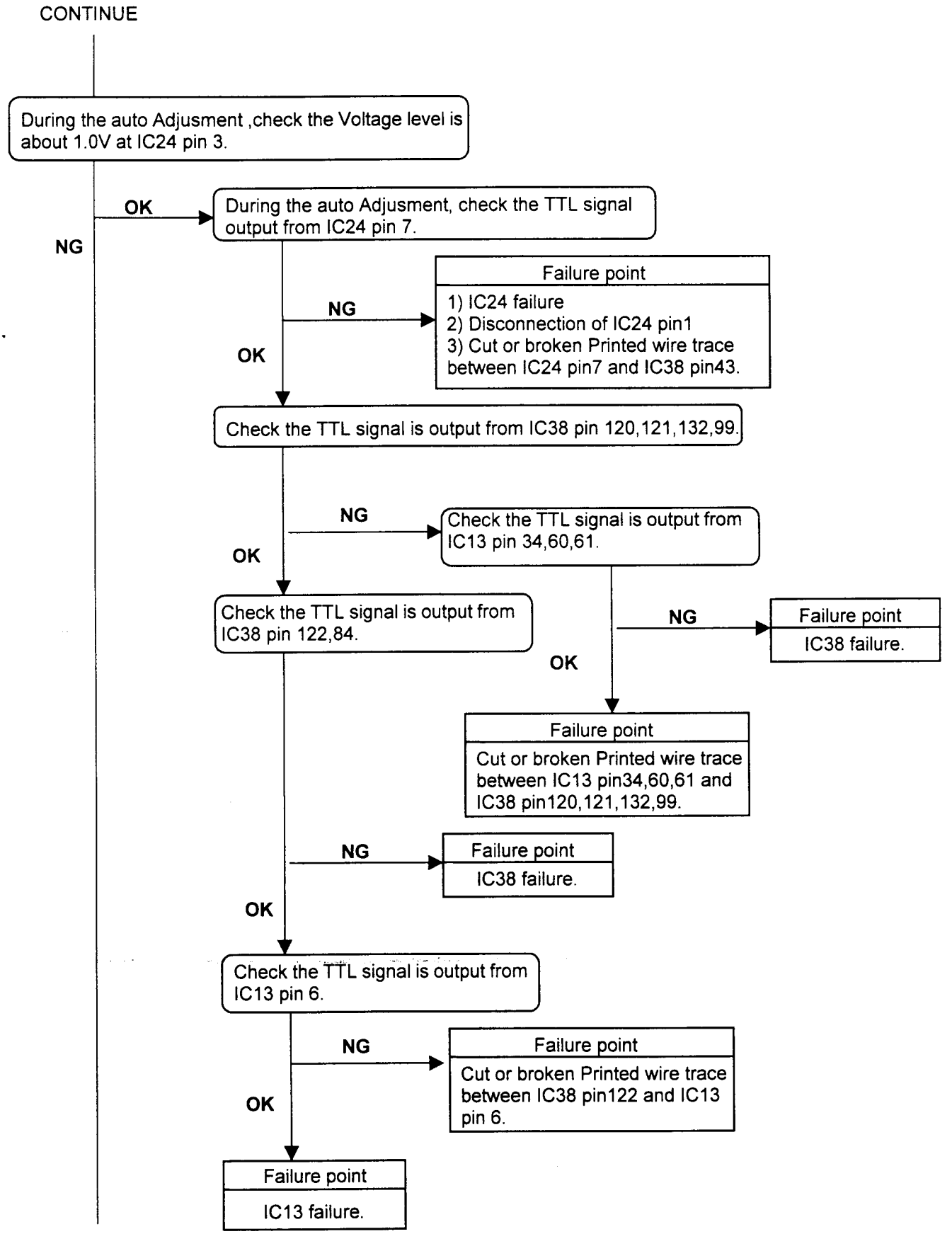
4. No OSM display

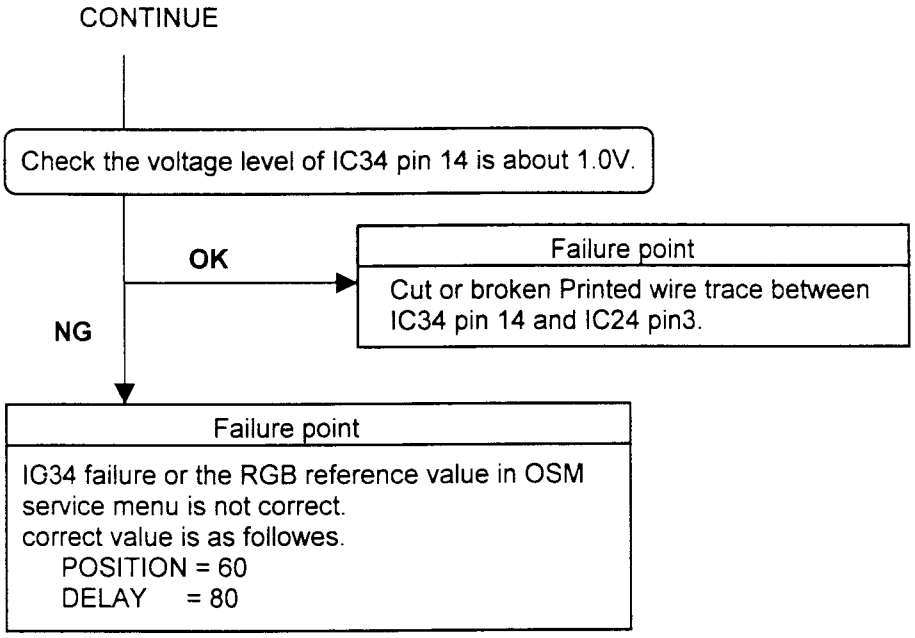

Is LED lit ?
NG
Failure point
The cable may be disconnected between SUB PWB and MAIN PWB.
OK
Check the output of 5Vp-p signal from IC8 pin 12, 13, 15, 17 when pushing PROCEED key.
OK
Check the input signal of IC38 pin 99, 97, 98 are same as IC8 pin 13, 15, 17, or check input signal of IC38 pin 92 is same as IC8 pin12 .
NG
Failure point
1) Disconnection between IC8 pin 12 and IC38 pin 92.
2) Disconnection between IC8 pin 13 and IC38 pin 99.
3) Disconnection between IC8 pin 15 and IC38 pin 97.
4) Disconnection between IC8 pin 17 and IC38 pin 98.
OK
Check the input signal of IC38 pin 88, 87, 86 are same as IC3 pin 14,17 and IC7 pin2 .
NG
NG
Failure point
Disconnection between IC38 pin 86 and IC3 pin 14, between IC38 pin87 and IC3 pin17, between IC38 pin 86 and IC3 pin18.
OK
Proceed to section 3 “Abnormal screen”.
Check the +5V is supply on IC8 pin 8 , 20.
NG
Failure point
1) C38, C35 or C36 short.
2) IC41 failure
3) Disconnection between IC41 pin 3 and IC8 pin 8, 20.
OK
Check positive horizontal sync signal on IC8 pin 18 at TTL level.
NG
Check the positive horizontal sync singnal on IC38 pin 95.
OK
Failure point
1) Disconnection between IC38 pin 95 and IC8 pin 18.
2) R58 short.
NG
OK
Proceed to section 7 “Checking the G/A”.
CONTINUE


CONTINEU
Check the positive horizontal sync signal on IC8 pin 19 at TTL level.
NG
Check the positive horizontal sync signal on IC38 pin 59 at TTL level.
OK
Failure point
1) Disconnection between IC38 pin 59 and IC8 pin 19.
2) R59 short.
NG
Proceed to section 7 “Checking the G/A”.
OK
Failure point
IC8 failure.

5. Auto adjustment

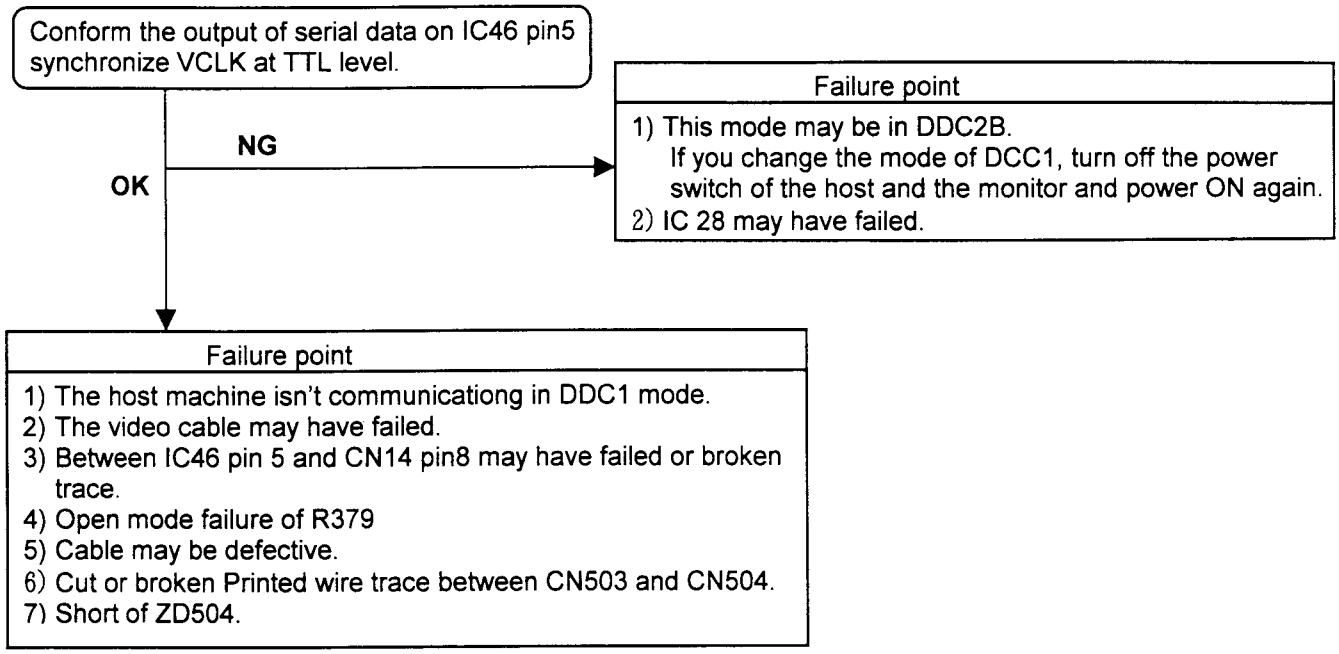

During the auto Adjusment , check the dot clock signal input to IC38 pin 67 .
NG
During the auto Adjusment , check the dot clock signal input to IC26 pin 7 .
OK
NG
2.1 Checking the dot clock oscillator.
OK
Failure point
1) Open failure of R74
2) Disconnection between IC26 pin 7 and IC38 pin67.
During the auto Adjusment , check the video signal input to IC24 pin 2 .
NG
During the auto Adjusment , check the video signal is output from IC6 pin 7.
NG
Failure point
IC6 failure.
OK
OK
During the auto Adjusment , check the 0.7Vp-p video signal output from IC7 pin 6,8,11.
NG
Check +5V supply to IC7 pin14 .
OK
Failure point
1) Disconnection between IC7 pin 6,8,11 and R44,R45,R46.
2) R44,R45,R46 failure.
NG
Failure point
1) L25 open.
2) Short of C34.
OK
During auto adjustment, check the pulse signal output from IC13 pin 3,2,1.
NG
Failure point
Disconnection between IC13 pin 3, 2, 1 and IC7.
OK
Failure point
IC13 failure.
CONTINUE


CONTINUE
During the auto Adjusment ,check the Voltage level is about 1.0V at IC24 pin 3.
OK
NG
During the auto Adjusment, check the TTL signal output from IC24 pin 7.
NG
Failure point
1) IC24 failure
2) Disconnection of IC24 pin1
3) Cut or broken Printed wire trace between IC24 pin7 and IC38 pin43.
OK
Check the TTL signal is output from IC38 pin 120,121,132,99.
NG
Check the TTL signal is output from IC13 pin 34,60,61.
OK
Check the TTL signal is output from IC38 pin 122,84.
NG
Failure point
IC38 failure.
OK
Failure point
Cut or broken Printed wire trace between IC13 pin34,60,61 and IC38 pin120,121,132,99.
NG
Failure point
IC38 failure.
OK
Check the TTL signal is output from IC13 pin 6.
NG
Failure point
Cut or broken Printed wire trace between IC38 pin122 and IC13 pin 6.
OK
Failure point
IC13 failure.
CONTINUE

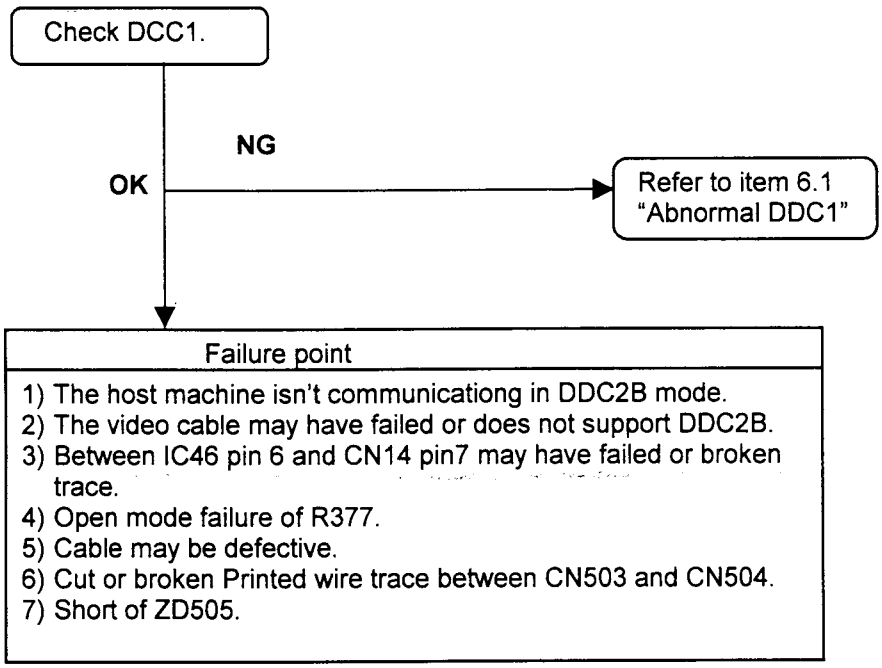

CONTINUE
Check the voltage level of IC34 pin 14 is about 1.0V.
OK
Failure point
Cut or broken Printed wire trace between IC34 pin 14 and IC24 pin3.
NG
Failure point
IG34 failure or the RGB reference value in OSM service menu is not correct.
correct value is as followes.
POSITION = 60
DELAY = 80

6. Abnormal plug and play operation

6.1Abnormal DDC1

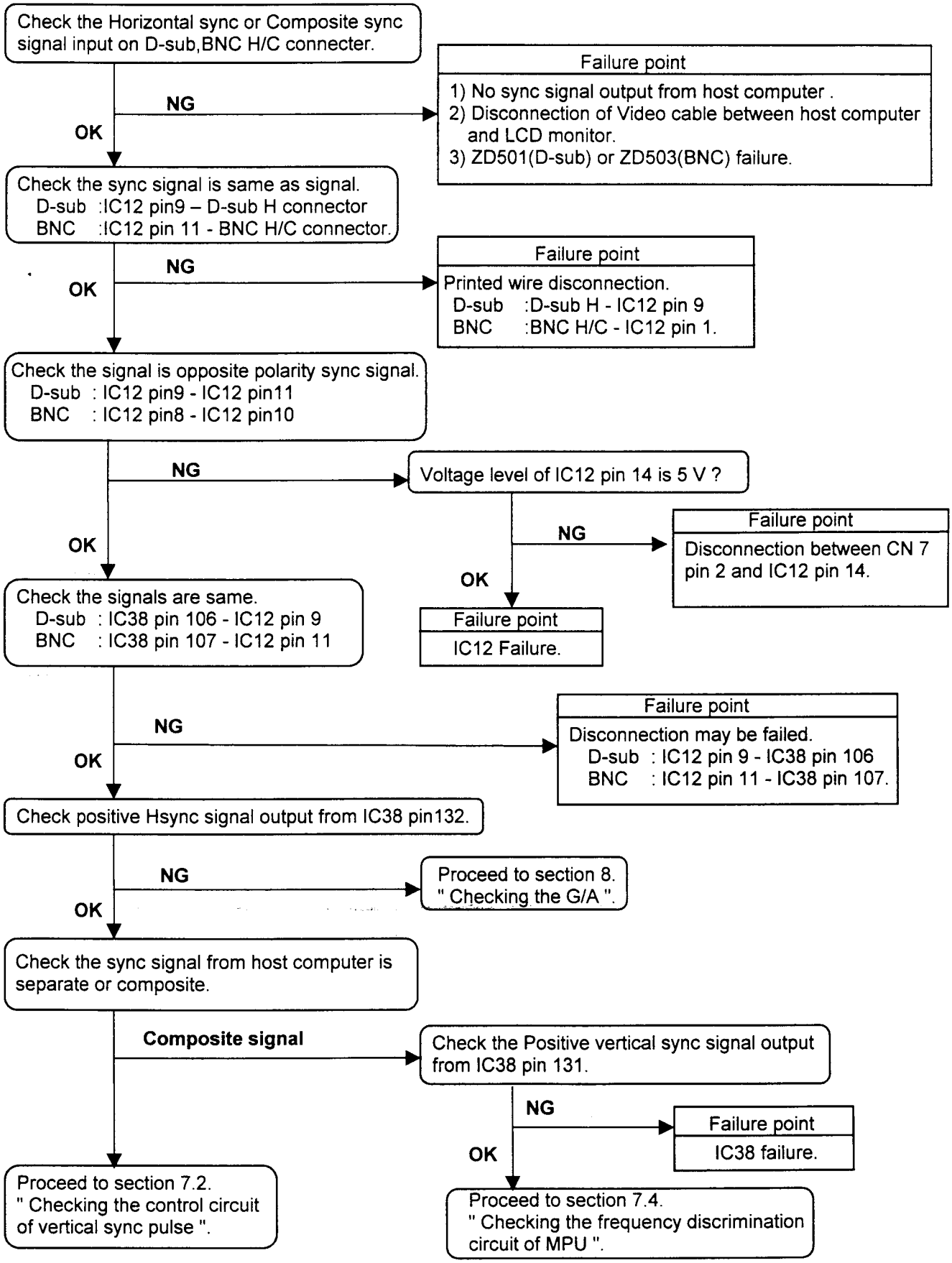

Conform the output of serial data on IC46 pin5 synchronize VCLK at TTL level.
NG
OK
Failure point
1) This mode may be in DDC2B.
If you change the mode of DCC1, turn off the power switch of the host and the monitor and power ON again.
2) IC 28 may have failed.
Failure point
1) The host machine isn't communicationg in DDC1 mode.
2) The video cable may have failed.
3) Between IC46 pin 5 and CN14 pin8 may have failed or broken trace.
4) Open mode failure of R379
5) Cable may be defective.
6) Cut or broken Printed wire trace between CN503 and CN504.
7) Short of ZD504.

6.2Abnormal DDC2B

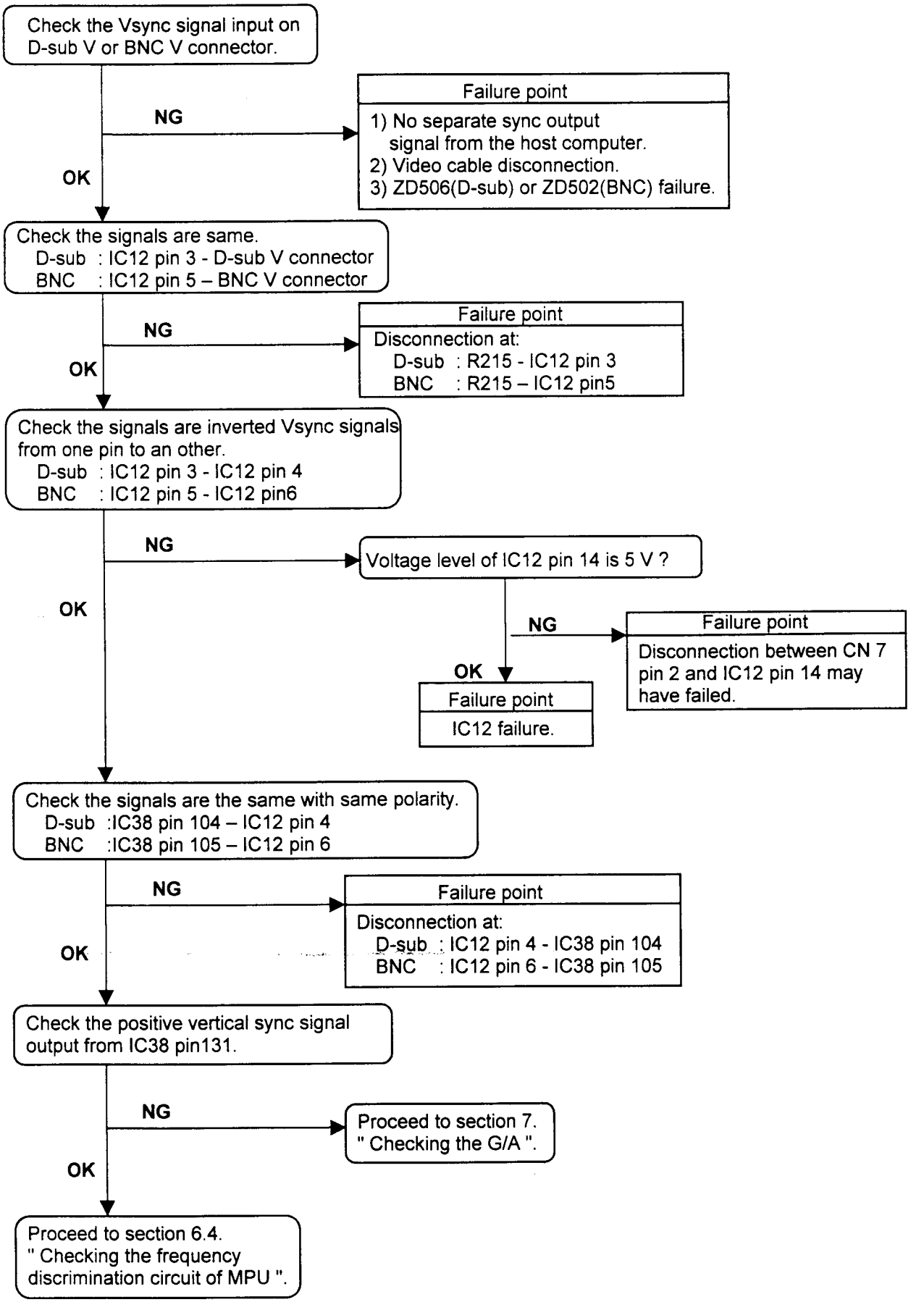

Check DCC1.
NG
OK
Refer to item 6.1 "Abnormal DDC1"
Failure point
1) The host machine isn't communicationg in DDC2B mode.
2) The video cable may have failed or does not support DDC2B.
3) Between IC46 pin 6 and CN14 pin7 may have failed or broken trace.
4) Open mode failure of R377.
5) Cable may be defective.
6) Cut or broken Printed wire trace between CN503 and CN504.
7) Short of ZD505.

7. Checking the interface circuit of sync signal

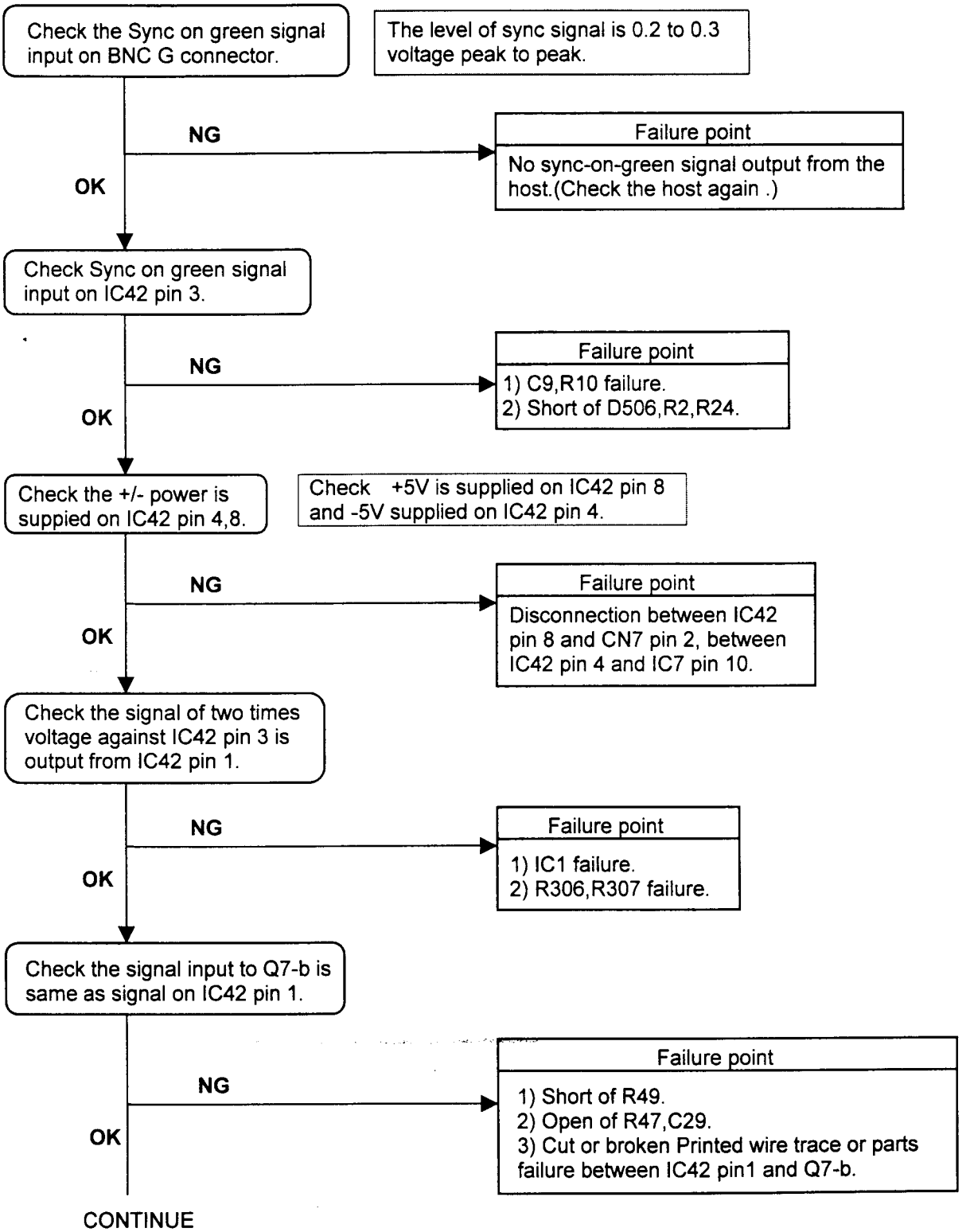
7.1 Checking the control circuit of horizontal sync pulse and composite sync pulse

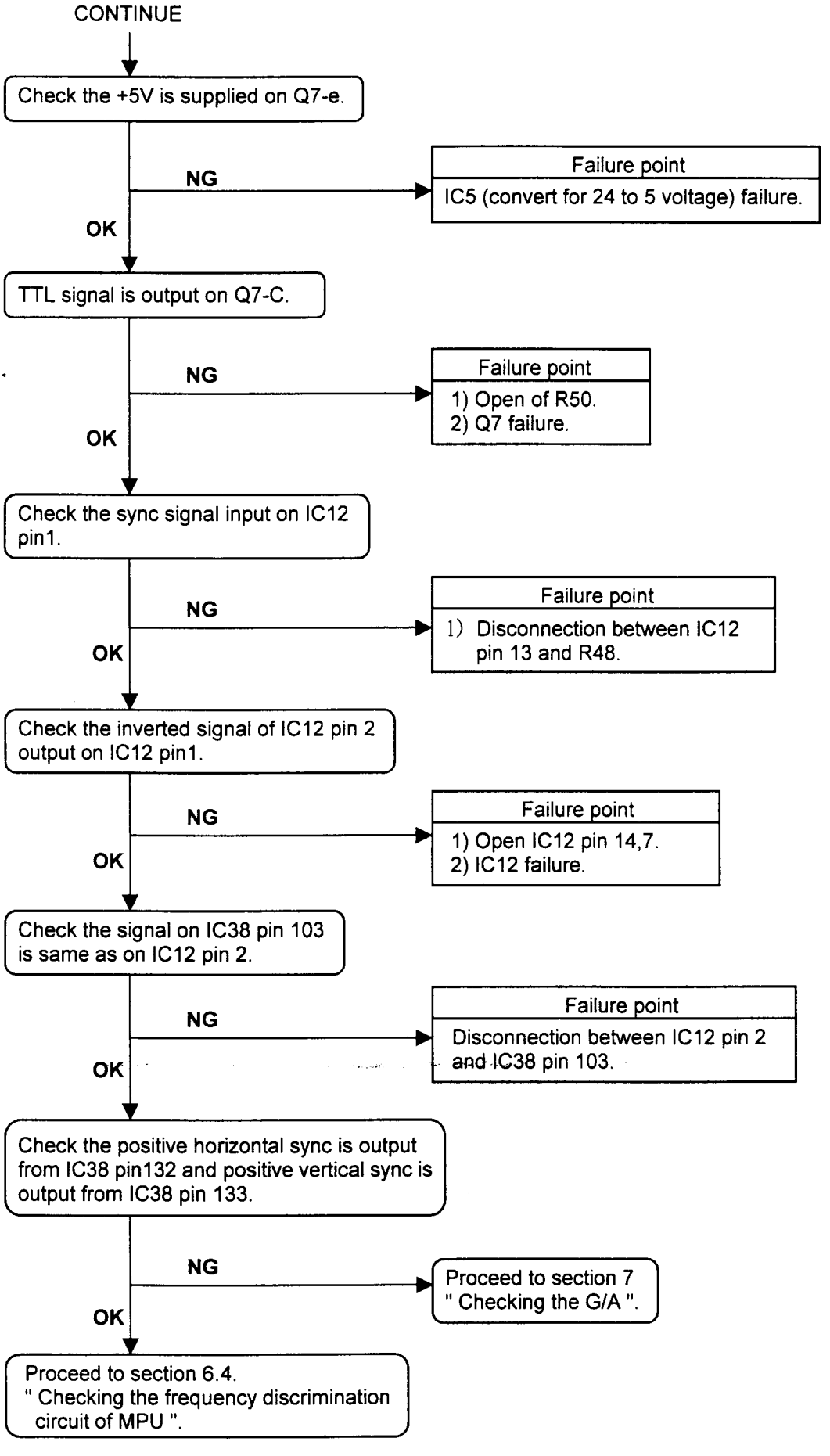

Check the Horizontal sync or Composite sync signal input on D-sub,BNC H/C connecter.
NG
Failure point
1) No sync signal output from host computer .
2) Disconnection of Video cable between host computer and LCD monitor.
3) ZD501(D-sub) or ZD503(BNC) failure.
OK
Check the sync signal is same as signal.
D-sub :IC12 pin9 – D-sub H connector
BNC :IC12 pin 11 - BNC H/C connector.
NG
Failure point
Printed wire disconnection.
D-sub :D-sub H - IC12 pin 9
BNC :BNC H/C - IC12 pin 1.
OK
Check the signal is opposite polarity sync signal.
D-sub : IC12 pin9 - IC12 pin11
BNC : IC12 pin8 - IC12 pin10
NG
Voltage level of IC12 pin 14 is 5 V ?
NG
Failure point
Disconnection between CN 7 pin 2 and IC12 pin 14.
OK
Failure point
IC12 Failure.
OK
Check the signals are same.
D-sub : IC38 pin 106 - IC12 pin 9
BNC : IC38 pin 107 - IC12 pin 11
NG
Failure point
Disconnection may be failed.
D-sub : IC12 pin 9 - IC38 pin 106
BNC : IC12 pin 11 - IC38 pin 107.
OK
Check positive Hsync signal output from IC38 pin132.
NG
Proceed to section 8.
" Checking the G/A ".
OK
Check the sync signal from host computer is separate or composite.
Composite signal
Check the Positive vertical sync signal output from IC38 pin 131.
NG
Failure point
IC38 failure.
OK
Proceed to section 7.2.
" Checking the control circuit of vertical sync pulse ".
Proceed to section 7.4.
" Checking the frequency discrimination circuit of MPU ".

7.2 Checking the control circuit of vertical sync pulse

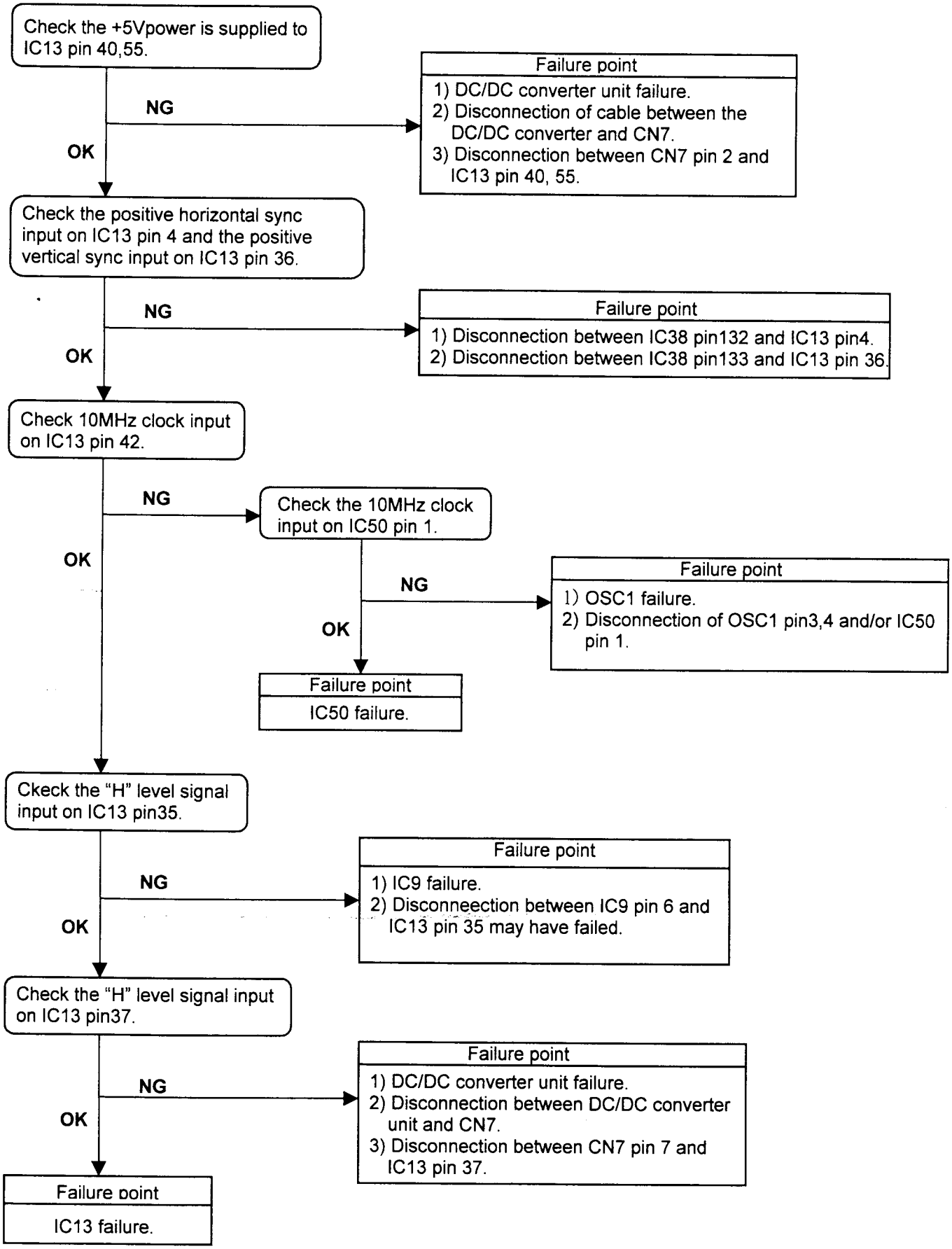

Check the Vsync signal input on D-sub V or BNC V connector.
NG
Failure point
1) No separate sync output signal from the host computer.
2) Video cable disconnection.
3) ZD506(D-sub) or ZD502(BNC) failure.
OK
Check the signals are same.
D-sub : IC12 pin 3 - D-sub V connector
BNC : IC12 pin 5 – BNC V connector
NG
Failure point
Disconnection at:
D-sub : R215 - IC12 pin 3
BNC : R215 – IC12 pin5
OK
Check the signals are inverted Vsync signals from one pin to an other.
D-sub : IC12 pin 3 - IC12 pin 4
BNC : IC12 pin 5 - IC12 pin6
NG
Voltage level of IC12 pin 14 is 5 V ?
NG
Failure point
Disconnection between CN 7 pin 2 and IC12 pin 14 may have failed.
OK
Failure point
IC12 failure.
OK
Check the signals are the same with same polarity.
D-sub :IC38 pin 104 – IC12 pin 4
BNC :IC38 pin 105 – IC12 pin 6
NG
Failure point
Disconnection at:
D-sub : IC12 pin 4 - IC38 pin 104
BNC : IC12 pin 6 - IC38 pin 105
OK
Check the positive vertical sync signal output from IC38 pin131.
NG
Proceed to section 7. " Checking the G/A ".
OK
Proceed to section 6.4. " Checking the frequency discrimination circuit of MPU ".

7.3 Checking the interface circuit of sync-on-green

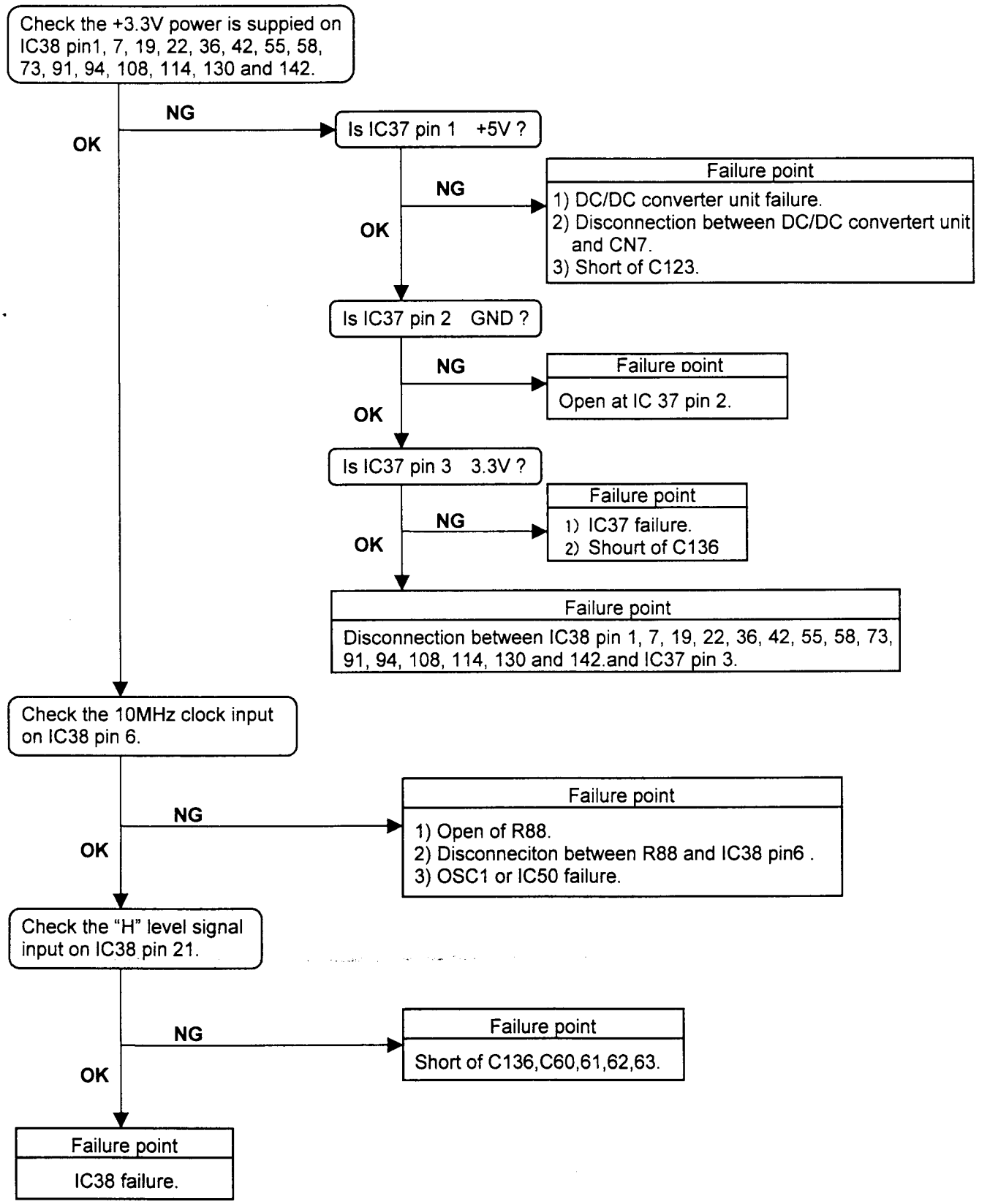

Check the Sync on green signal input on BNC G connector.
The level of sync signal is 0.2 to 0.3 voltage peak to peak.
NG
Failure point
No sync-on-green signal output from the host.(Check the host again .)
OK
Check Sync on green signal input on IC42 pin 3.
NG
Failure point
1) C9,R10 failure.
2) Short of D506,R2,R24.
OK
Check the +/- power is suppied on IC42 pin 4,8.
Check +5V is supplied on IC42 pin 8 and -5V supplied on IC42 pin 4.
NG
Failure point
Disconnection between IC42 pin 8 and CN7 pin 2, between IC42 pin 4 and IC7 pin 10.
OK
Check the signal of two times voltage against IC42 pin 3 is output from IC42 pin 1.
NG
Failure point
1) IC1 failure.
2) R306,R307 failure.
OK
Check the signal input to Q7-b is same as signal on IC42 pin 1.
NG
Failure point
1) Short of R49.
2) Open of R47,C29.
3) Cut or broken Printed wire trace or parts failure between IC42 pin1 and Q7-b.
OK
CONTINUE


CONTINUE
Check the +5V is supplied on Q7-e.
NG
Failure point
IC5 (convert for 24 to 5 voltage) failure.
OK
TTL signal is output on Q7-C.
NG
Failure point
1) Open of R50.
2) Q7 failure.
OK
Check the sync signal input on IC12 pin1.
NG
Failure point
1) Disconnection between IC12 pin 13 and R48.
OK
Check the inverted signal of IC12 pin 2 output on IC12 pin1.
NG
Failure point
1) Open IC12 pin 14,7.
2) IC12 failure.
OK
Check the signal on IC38 pin 103 is same as on IC12 pin 2.
NG
Failure point
Disconnection between IC12 pin 2 and IC38 pin 103.
OK
Check the positive horizontal sync is output from IC38 pin132 and positive vertical sync is output from IC38 pin 133.
NG
Proceed to section 7 " Checking the G/A ".
OK
Proceed to section 6.4. " Checking the frequency discrimination circuit of MPU ".

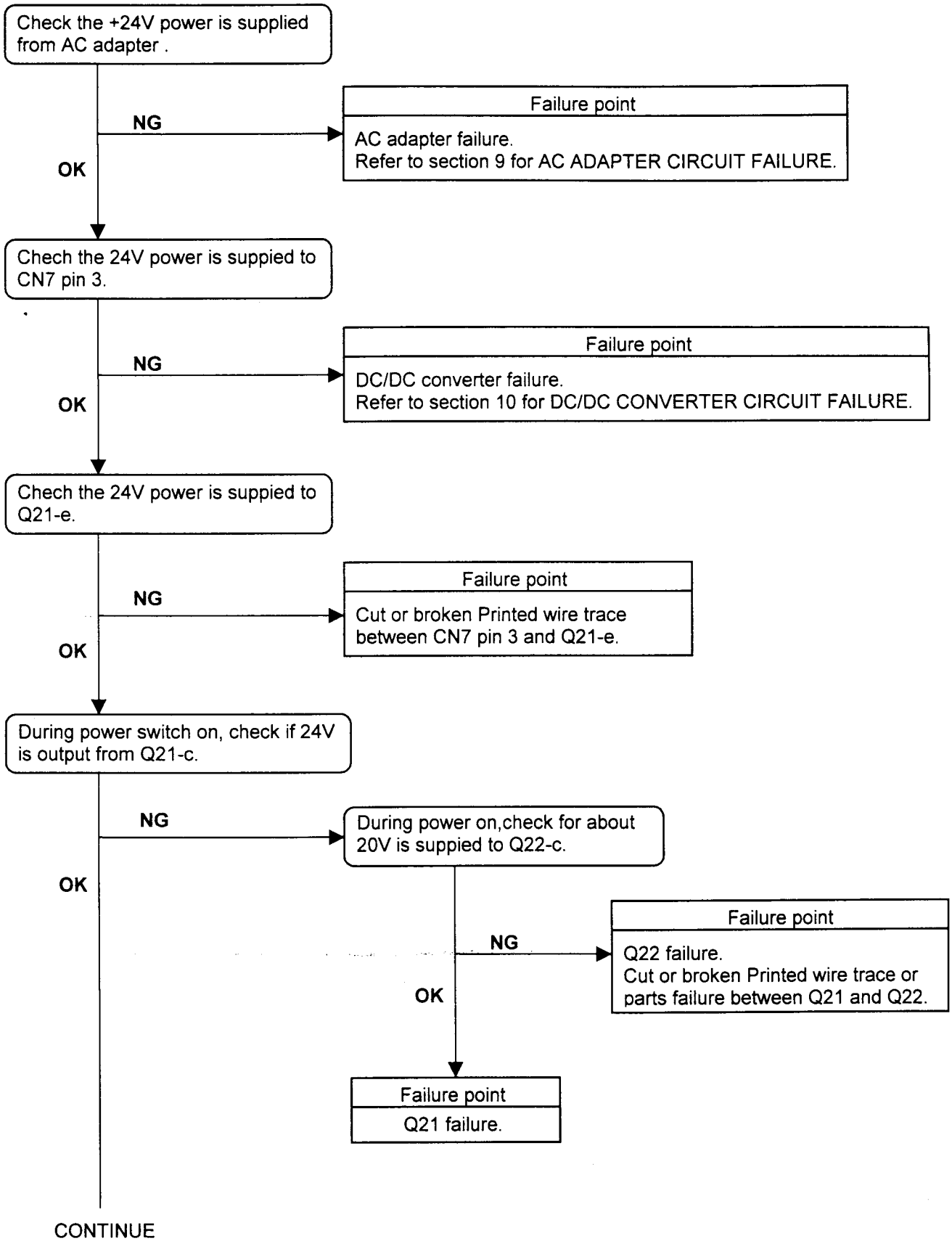
7.4 Checking the frequency discrimination circuit of MPU

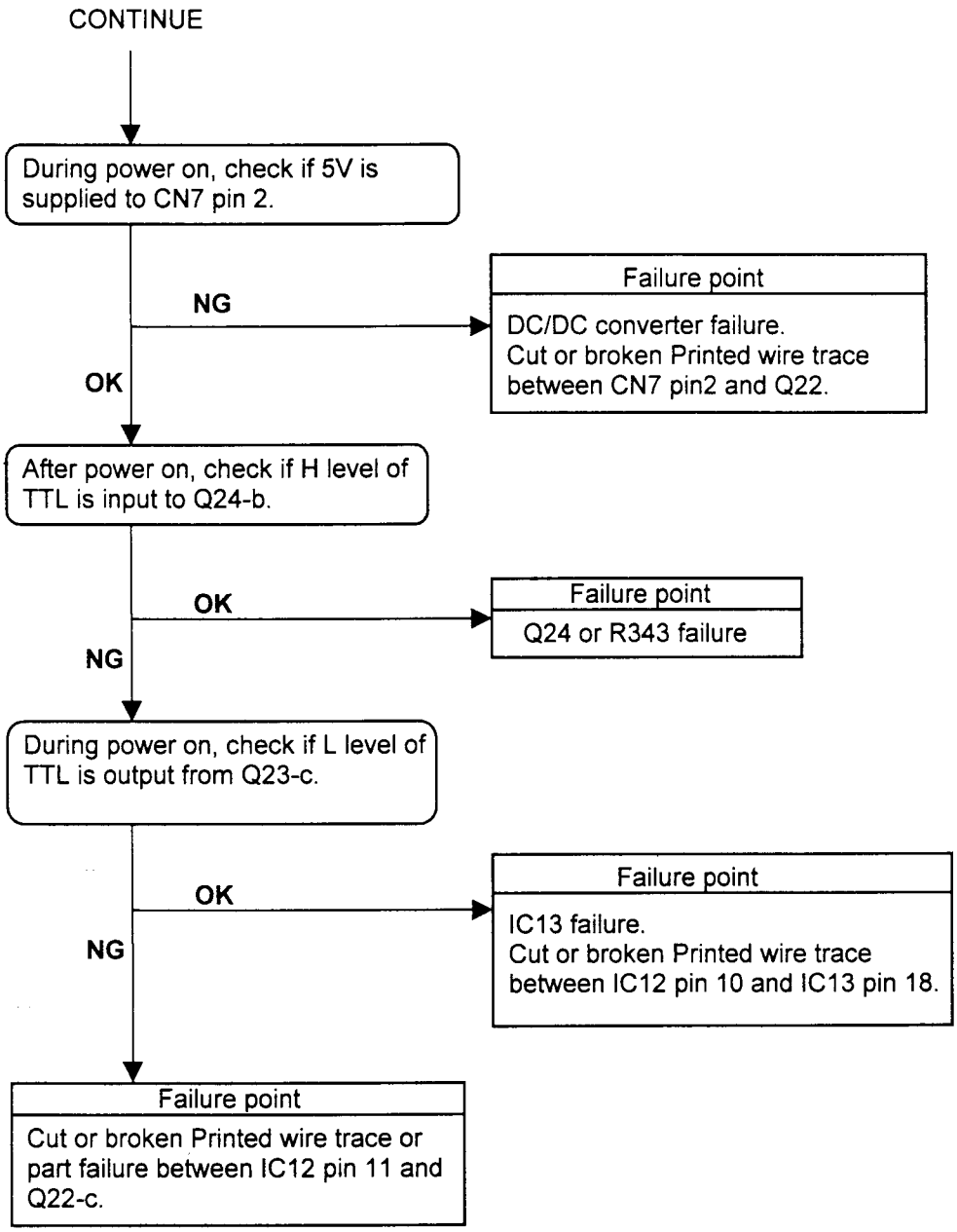

Check the +5Vpower is supplied to IC13 pin 40,55.
NG
Failure point
1) DC/DC converter unit failure.
2) Disconnection of cable between the DC/DC converter and CN7.
3) Disconnection between CN7 pin 2 and IC13 pin 40, 55.
OK
Check the positive horizontal sync input on IC13 pin 4 and the positive vertical sync input on IC13 pin 36.
NG
Failure point
1) Disconnection between IC38 pin132 and IC13 pin4.
2) Disconnection between IC38 pin133 and IC13 pin 36.
OK
Check 10MHz clock input on IC13 pin 42.
NG
Check the 10MHz clock input on IC50 pin 1.
OK
NG
Failure point
1) OSC1 failure.
2) Disconnection of OSC1 pin3,4 and/or IC50 pin 1.
OK
Failure point
IC50 failure.
Ckeck the "H" level signal input on IC13 pin35.
NG
Failure point
1) IC9 failure.
2) Disconneection between IC9 pin 6 and IC13 pin 35 may have failed.
OK
Check the "H" level signal input on IC13 pin37.
NG
Failure point
1) DC/DC converter unit failure.
2) Disconnection between DC/DC converter unit and CN7.
3) Disconnection between CN7 pin 7 and IC13 pin 37.
OK
Failure point
IC13 failure.

8. Checking the G/A

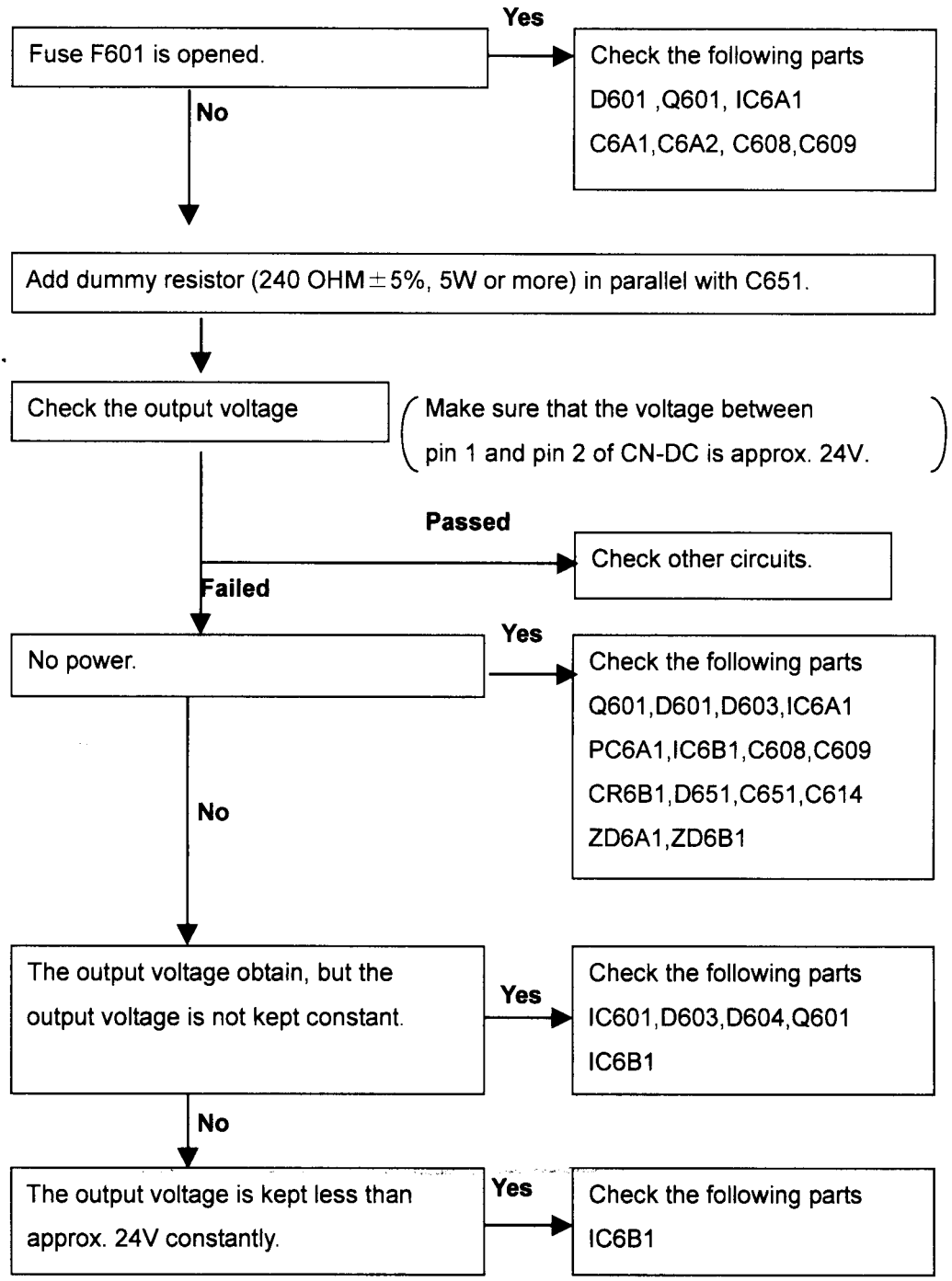

Check the +3.3V power is suppied on IC38 pin1, 7, 19, 22, 36, 42, 55, 58, 73, 91, 94, 108, 114, 130 and 142.
NG
OK
Is IC37 pin 1 +5V ?
NG
OK
Failure point
1) DC/DC converter unit failure.
2) Disconnection between DC/DC convertert unit and CN7.
3) Short of C123.
Is IC37 pin 2 GND ?
NG
OK
Failure point
Open at IC 37 pin 2.
Is IC37 pin 3 3.3V ?
NG
OK
Failure point
1) IC37 failure.
2) Shourt of C136
Failure point
Disconnection between IC38 pin 1, 7, 19, 22, 36, 42, 55, 58, 73, 91, 94, 108, 114, 130 and 142.and IC37 pin 3.
Check the 10MHz clock input on IC38 pin 6.
NG
OK
Failure point
1) Open of R88.
2) Disconneciton between R88 and IC38 pin6 .
3) OSC1 or IC50 failure.
Check the "H" level signal input on IC38 pin 21.
NG
OK
Failure point
Short of C136,C60,61,62,63.
Failure point
IC38 failure.

9. NO POWER ON


Check the +24V power is supplied from AC adapter .
NG
Failure point
AC adapter failure.
Refer to section 9 for AC ADAPTER CIRCUIT FAILURE.
OK
Chech the 24V power is suppied to CN7 pin 3.
NG
Failure point
DC/DC converter failure.
Refer to section 10 for DC/DC CONVERTER CIRCUIT FAILURE.
OK
Chech the 24V power is suppied to Q21-e.
NG
Failure point
Cut or broken Printed wire trace between CN7 pin 3 and Q21-e.
OK
During power switch on, check if 24V is output from Q21-c.
NG
During power on,check for about 20V is suppied to Q22-c.
OK
NG
Failure point
Q22 failure.
Cut or broken Printed wire trace or parts failure between Q21 and Q22.
OK
Failure point
Q21 failure.
CONTINUE


CONTINUE
During power on, check if 5V is supplied to CN7 pin 2.
NG
Failure point
DC/DC converter failure.
Cut or broken Printed wire trace between CN7 pin2 and Q22.
OK
After power on, check if H level of TTL is input to Q24-b.
OK
Failure point
Q24 or R343 failure
NG
During power on, check if L level of TTL is output from Q23-c.
OK
Failure point
IC13 failure.
Cut or broken Printed wire trace between IC12 pin 10 and IC13 pin 18.
NG
Failure point
Cut or broken Printed wire trace or part failure between IC12 pin 11 and Q22-c.

10. AC ADAPTER CIRCUIT FAILURE



11.DC-DC CONVERTER CIRCUIT FAILURE.

◎ Test condition : Use the AC adapter to supply the input DC voltage.
: Turn on the Power switch.(At Checking output voltage with set.)

Check the output voltage.

1.Make sure that the voltage between 3,4 -1,2 of CN702 is approx. 12V
2.Make sure that the voltage between 8,9,10 - 5 of CN702 is approx. 12V
3.Make sure that the voltage between 8,9,10 - 6 of CN702 is approx. 5V
4.Make sure that the voltage between 8.9,10 - 7 of CN702 is approx. 24V
5.Make sure that the voltage between 8,9,10 - 11 of CN702 is approx. 24V
6.Make sure that the voltage between 8,9,10 - 12 of CN702 is approx. 24V
7.Make sure that the voltage between 8,9,10 - 13 of CN702 is approx. 5V
8.Make sure that the voltage between 8,9,10 - 14 of CN702 is approx. -5V
9.Make sure that the voltage between 2,3,4 - 5 of CN703 is approx. 12V or 5V

OK → Check other circuits.

NG

1.Disconnect the AC plug and wait 1 minute.
2.Disconnect connector(CN702) from CONTROL PWB.
3.Add dummy resistor (2.7 OHM±5%, more than 54W) both ends of C703.
4.Add dummy resistor (10 OHM±5%, more than 14.4W) both ends of C705.
5.Add dummy resistor (4.7 OHM±5%, more than 5.4W) both ends of C707.
6.Add dummy resistor (470 OHM±5%, more than 1.3W) both ends of C734.
7.Add dummy resistor (62 OHM±5%, more than 0.4W) both ends of C762
8.Add dummy resistor (100 or 25 OHM±5%, more than 1.25W) both ends of C751
100 OHM : at output voltage is 12V
25 OHM : at output voltage is 5V
9.Connect the AC plug and check the output voltages again.

CONTINUE

CONTINUE

Check the voltage of both ends of C734 and the voltage between 8,9,10 - 11 of CN702

The voltage of both ends of C734 is 0V

Check L707, CR701
ZD703,ZD704,ZD705

The voltage between 8,9,10 - 11 of CN702 is 0V

Check IC704,D705,ZD701,ZD702

Supply DC voltage approx. DC24V between 8,9,10- 12 of CN702.
Check the voltage of both ends of C734 and C707.

The voltage of both ends of C707 or all outputs are 0V.

OK

Check IC703,Q716,Q717,
C735,C707
ZD706,ZD710,D704,D708
R746,L704,L705

The voltage of both ends of C762 or all outputs are 0V.

OK

Check IC761
C762
R763,R764
ZD761,D761,L761

The voltage of both ends of C751 or all outputs are 0V.

OK

Check IC751
R754
L751,D751,C751

CONTINUE

CONTINUE

Supply DC voltage approx. DC5V between 8,9,10- 13 of CN702.
Check the voltage of both ends of C705 and C702.

The voltage of both ends of C705 is 0V.

→ Check IC702,L702,L703,C705
D703,Q714,Q715

The voltage of both ends of C702 is 0V.

→ Check IC701,
Q701,Q702,Q703,Q704,Q709,Q711,
D702,ZD707,ZD708,ZD711,
C702,C703,C708,C709,C722
L701,T701

CIRCUIT DESCRIPTION

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1. VIDEO and OSD circuit (Page 2.3.18)

The Input impedance of the video signal is 75Ω. IC44,IC43,IC45 is OP amp to buffer video signal with video gain control by RV,GV.BV. The video signal buffered by these IC is clamped to 0V by Q1, Q2 or Q3. This clamp circuit is necessary to matrix the OSD signal at IC3 that are analog switch IC, because it is necessary that each black level is 0V. IC2 and IC6 is output buffer and output impedance is 75Ω.

IC8 OSD output signal is TTL level which is changed to 0.65Vp-p video signal in IC38.

IC42 amplifies green video signal 3.3 times to separate sync signal from sync on green signal.

Another gate of IC42 and IC7,IC3, R44, R45, R46 and IC24 are circuit for video signal detect to perform auto adjustment of position, image adjustment coarse and contrast. This circuit works only doing auto adjustment. In the normal operation, IC7 isolates video circuit and video signal detect circuit.

IC2 amplifies each video signal 3.3 times for auto adjustment.

IC41 is series regulator generating 5V from 12V

2. Sync Separation Circuit for Sync on Green (Page 4)

Q7 generate positive composite sync from amplified green video signal.

IC5 is series regulator generating 5V from 24V.

3. MPU Block (Page 5)

IC9 : Reset IC

Generats reset signal from +5V DC

Q9,Q10 : LED control Transistor

IC10 : EEPROM

EEPROM stores the following data:

- Power off status data
- LCD status data
- PLL circuit control data
- OSD data
- D/A control data
- factory preset data

IC13 : MPU

· Detects the power switch status.

MPU detects the 2 mode as POWER ON STATUS. This status is detected by method of power off. For example, if you turn off the power by power switch, you must use the power switch to turn on when you resume this monitor. If you turn off the power by disconnecting the AC power cable or DC cable , you can resume by re-connecting these cables.

· Frequency measurement of Hsync and Vsync

Frequency of Positive Hsync and Vsync are input at pins 4 and 36 as HPCPU and VPCPU signal and the display mode is detected in the following table.

Mode No.	HSYNC Frequency	VSYNC Frequency	SYNC Pol.		Display Mode	Remark
			HSYNC	VSYNC		
MOD [1]	24Khz≦fH≦30.8Khz				640X400(56)	PC98
MOD [2]	30.8kHz≦fH<33kHz	fV<65Hz			640X480(60)	IBM VGA
MOD [3]		65Hz≦fV	+	−	640X350(70)	IBM VGA
MOD [4]			−	+	640X400(70)	IBM VGA
MOD [5]	33kHz≦fH<43kHz	fV<58Hz			800X600(56)	VESA STANDARD
MOD [6]		58Hz≦fV<63Hz			800X600(60)	VESA STANDARD
MOD [7]		63Hz≦fV<70Hz			640X480(66)	MAC
MOD [8]		70Hz≦fV<73Hz			640X480(72)	VESA STANDARD
MOD [9]		73Hz≦fV			640X480(75)	VESA STANDARD
MOD [10]	43kHz≦fH<47.2kHz	fV<80Hz			800X600(75)	VESA STANDARD
MOD [11]	47.2kHz≦fH<51kHz	fV<63Hz			1024X768(60)	VESA STANDARD
MOD [12]		63Hz≦fV<73			800X600(72)	VESA STANDARD
MOD [13]		73Hz≦fV			832X624(75)	MAC
MOD [14]	51kHz≦fH<54kHz	FV<70Hz			1024X768(66)	VESA STANDARD
MOD [15]	54kHz≦fH<57.5kHz	fV<65Hz			1280X960(60)	VESA STANDARD
MOD [16]		65Hz≦fV			1024X768(70)	VESA STANDARD
MOD [17]	57.5kHz≦fH<62kHz	FV<70Hz			1152X900(66)	SUN
MOD [18]		70Hz≦fV			1024X768(75)	VESA STANDARD
MOD [19]	62kHz≦fH<64kHz				1280x1024(60)	VESA STANDARD
MOD [20]	64kHz≦fH<70kHz	fV<65Hz			1280x1024(60)	NEC EWS4800
MOD [21]	70kHz≦fH<76kHz	fV<70Hz			1280x1024(66)	SUN
MOD [22]		70Hz≦fV			1280x960(75)	VESA
MOD [23]	76kHz≦fH<81kHz				1280x1024(75)	VESA
MOD [24]	81kHz≦fH				1280x1024(76)	SUN

· PMS control

When input signal frequency is not within following frequency range, LCD1810 goes to power saving mode.

Hsync signal : 24KHz to 82KHz
Vsync signal : over 54Hz

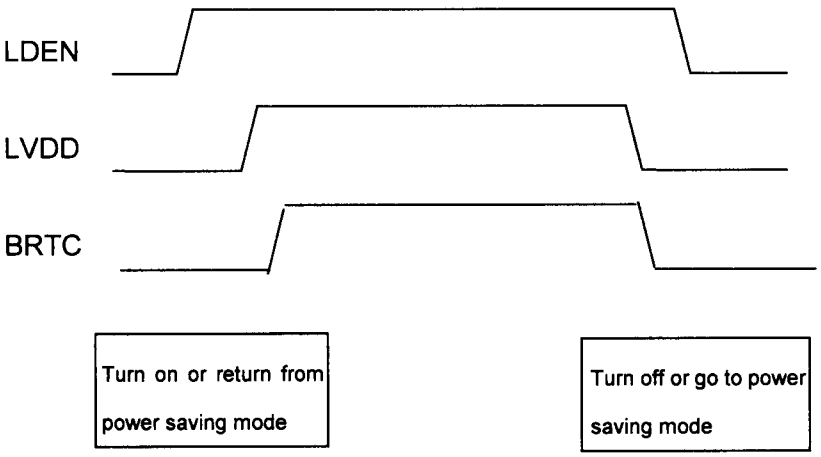
· Power sequence control

Power sequence control for turning on / off and PMS.

LDEN（Pin 31）：Control +5VA, +5VB and -5VA power supply output

LVDD(Pin 22):Control +12V power supply output, and 12VI for inverter power supply ouput.

BRTC (Pin 5) ：Backlight ON for Inverter



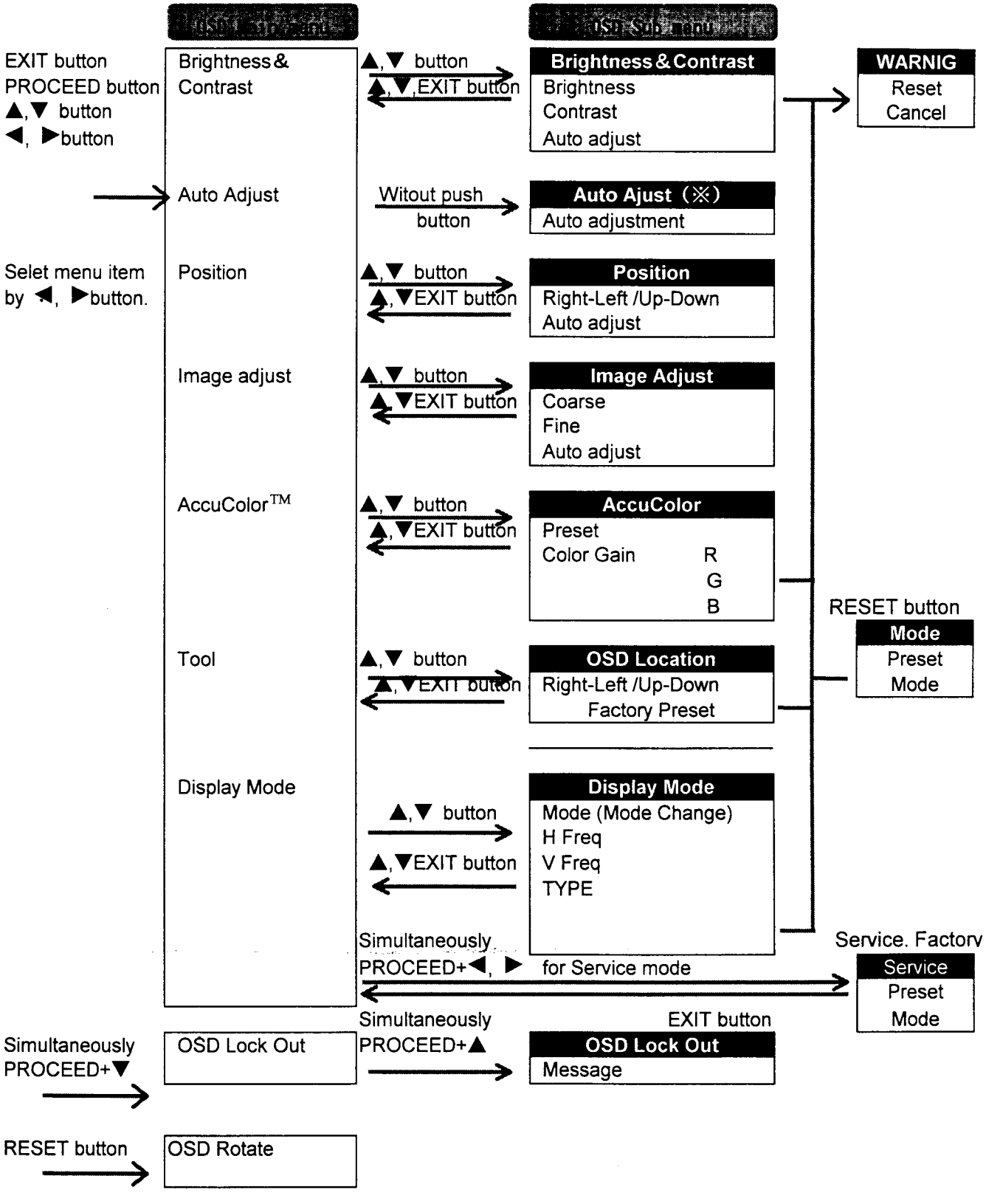
· Control of Video detector output for Auto-adjustment

· OSD control

Interface

SWITCH	10Pin	11Pin	12Pin	13Pin	14Pin	15Pin	16Pin
EXIT	Low	High	High	High	High	High	High
◀	High	Low	High	High	High	High	High
▼	High	High	Low	High	High	High	High
▲	High	High	High	Low	High	High	High
▶	High	High	High	High	Low	High	High
PROCEED	High	High	High	High	High	Low	High
RESET	High	High	High	High	High	High	Low

Structure of OSD menu



(※) No affected by RESET.

- LCD control

  LCD control manipulates LCD module functions which are displayed position, image adjust fine, and display mode through serial communication on following conditions.

  - Display mode is changed by input video timing
  - Display position and image adjust fine are changed by OSD control.
  - Each half second

- PLL Control

  Control Gate Array (IC38) is controlled to change Image adjust coarse by serial communication on following conditions.

  - Display mode is changed by input timing
  - Image adjust coarse is changed by OSD control

- DA Control

  DA Control converter is controlled to change brightness, contrast and AccuColor by serial communication when brightness, contrast or AccuColor are changed by OSD control

- LED Control

  LED color is controlled based on power saving modes.

- EEPROM Control

  Data are written and read from EEPROM and data are read from EEPROM by I^2C serial data communication.

- Auto Adjustment

  Calculates optimum display position and image adjust coarse from AUTODAT , VIDEOST and CLKOCKST signals Gate Array output.

  Calculates optimum Contrast from VTTL signal IC24 output.

Output Signal from MPU

Pin No.	I/O	Signal names	Functions	remarks
8	O	IICPOUT	N/A	
32	O	MODCHG	Mode change signal	
23	O	LCDSTB	Serial strobe signal for LCD	
39	O	INTREGSTB	Serial strobe signal for G/A	
17	O	XRON	Enable red for auto adjustment	0:ON 1:OFF
19	O	XBON	Enable blue for auto adjustment	0:ON 1:OFF
18	O	XGON	Enable green for auto adjustment	0:ON 1:OFF
19	O	SDAT	serial communication data	
7	O	SCLK	serial communication clock	
53	O	DA1STB	D/AC 1 select signal	
52	O	DA2STB	D/AC 2 select signal	
25	O	POWC	Control LCD module working	1: work 0: don't work
5	O	BRTC	control backlight lighting	1: backlight lighting
31	O	LDEN	LCD enable signal	0: power saving mode
26	O	SW0	Power on/off control	1: On 0: Off
27	O	LEDG	control green LED	1: light green 0: not light
28	O	LEDA	control amber LED	1: light amber 0: not light
22	O	LVDD	+12V control for DC/DC con.	1: ON、0: OFF
59	O	OSDCLK	serial communication clock between OSD IC	
58	O	OSDDAT	serial communication data between OSD IC	
63	O	OSDSTB	serial communication strobe between OSD IC	
61	O	AUTOACT	enable signal for auto adjustment	
34	O	AUTOCLK	serial communication clock between GA for auto adjustment	
60	O	AUTOSTB	serial communication strobe between GA for auto adjustment	
54	O	AJSTSTAH	N/A	
57	O	AJSTSTBH	N/A	
20	O	AJSTCLK	N/A	

4. Gate Array (Page 7)

OSC1 :

IC12 : TTL Buffer

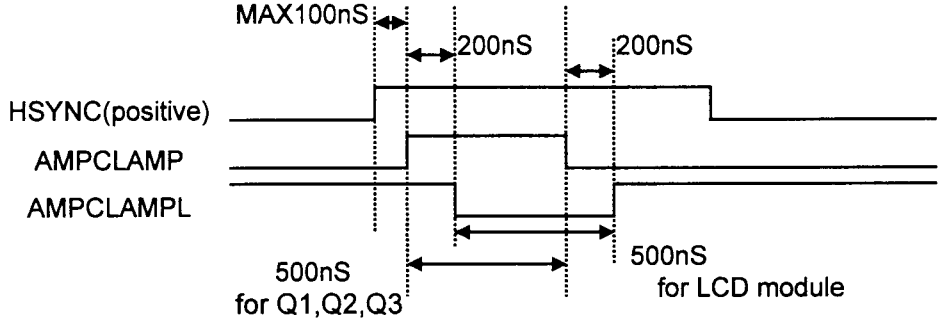
IC38 : Gate Array

- discrimination of sync signals which are separate, composite or sync on green
- discrimination of sync signal polarity
- generate Hsync and Vsync signal from composite sync signal or composite signal from sync on green.
- generate internal sync signal

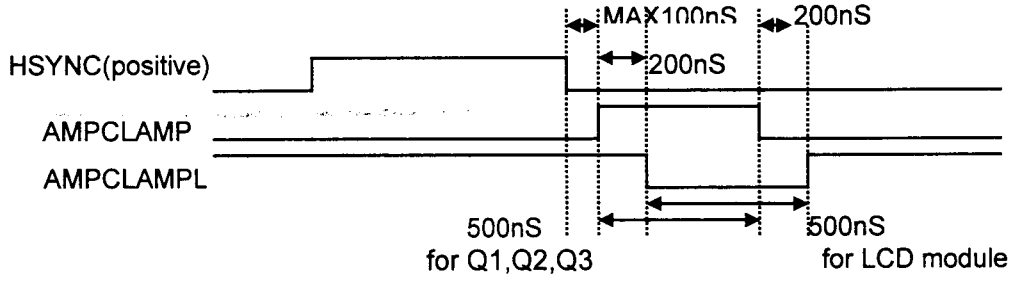
  To display OSD during power saving mode, generate Hsync and Vsync from10MHz clock.
- phase detect circuit for PLL
- generate clamp signal

  Generate video clamp signal for Q1, Q2, Q3, and LCD module as following figure.

[Separate, Composite]



[Sync on green]



- Calculation for auto adjustment

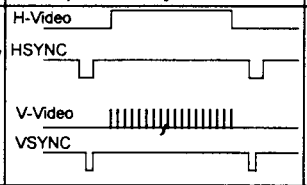
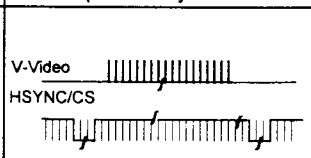
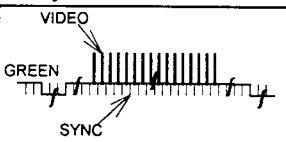
  generate AUTODAT , VIDEOST and CLOCKST signal for auto adjustment

  AUTODAT : data of image position of video signal (serial data)

  VIDEOST : existence of image data in H period

  CLOCKST : status (H or L) of dotclock at beginning of picture

Output signal of IC38 (TTL output 1 : High level、 0 : Low level)

	Separate sync mode	Composite sync mode	Sync on Green mode
Sync mode (These figure show Negative Sync type)			
SMOD1,2(141,16Pin)	SMOD1,SMOD2= 1 , 1	SMOD1,SMOD2= 1 , 0	SMOD1,SMOD2= 0 , –
HSPOL(134Pin)	0 : Positive 1 : Negative	0 : Positive 1 : Negative	0 : N/A 1 : Negative
VSPOL(133Pin)	0 : Positive 1 : Negative	0 : Positive 1 : Negative	0 : N/A 1 : Negative
HPCPU(132Pin)	Internal positive Hsync signal for MPU		
VPCPU(131Pin)	internal positive Vsync signal for MPU		
VNLCD(82Pin)	internal negative Vsync signal for LCD module		
HPOSDH1(95Pin)	Internal positive Hsync signal for OSD IC		
VPOSDH(59Pin)	Internal positive Vsync signal for OSD IC		
OSDTCK(57Pin)	Dotclock for OSD		
OSDROUT(88Pin)	Red video for OSD		
OSDGOUT(87Pin)	Green video for OSD		
OSDBOUT(86Pin)	Blue video for OSD		
VIDEOMSK(100Pin)	Mask signal for video		
VIDEOSEL(101Pin)	Video selector 0 : not select video, 1 : select video		
XVIDEOSEL(113Pin)	Video selector for OSD 0 : not select OSD, 1 : select OSD		
BLPWM(115Pin)	PWM signal for INVERTER		
XM1(56Pin)	prescaler control signal 1:over 75Hz 0: under 75Hz		
WPRT(119Pin)	Control signal for DDC IC		
INTSTS(116Pin)	N/A		
REHSYNCH(76Pin)	internal positive Hsync signal for auto adjustment		
FV1L(112Pin)	internal negative Hsync signal for PLL		
RPDOUT(46Pin)	phase detect signal between FR signal and XXFV signal		
VPDOUT(47Pin)	phase detect signal between FR signal and XXFV signal		
XHSYNCL(75Pin)	internal negative Hsync signal for LCD module		
LCDCLAMP(23Pin)	Video clamp signal for LCD module		
AMPCLAMP(129Pin)	Video clamp signal for video buffer		
AMPCLAMPL(24Pin)	Video clamp signal for LCD module		
AUTODAT(122Pin)	serial data signal for auto adjustment		
CLOCKST(2Pin)	Status of clock for auto adjustment. Output 1 when status of dotclock at beginning of picture is high. Output 0 when status of dotclock at beginning of picture is low.		
VIDEOST(140Pin)	Status of video signal for auto adjustment. Output 1 when picture exist or 0 when picture is not between 2 horizontal sync pulses.		
XAUTOACT(84Pin)	inverted AUTOACT signal		

5. PLL Circuit (Page8 ,9)

IC26 : ECL Buffer

ECL driver for dot clock

IC21 : OP Amp

Low pass active filter for PLL

VCO1 : VCO

Voltage control oscillator. Frequency range is 200MHz to 400MHz

IC19 : Prescaler

Count down VCO output signal to 1/2 or 1/4 frequency

Dot clk Freq.	Ratio VCO output Freq: Dot clock
under 75MHz	4:1 (1/4)
Over 75MHz	2:1 (1/2)

6. Video detector (Page 10)

IC24 :High speed comparator

Detects video level for auto adjustment of position and image adjust coarse and detects maximum video amplitude for auto contrast adjustment.

7. Color adjustment circuit (Page 11)

IC27,IC28,,IC39 : OP AMP

RL,BL,GL : Generate DC signal between 1.42 to 2.52V from DC signal between 0 to 5V DA converter output

RM,BM,GM : Generate DC signal between 3.15 to 4.24V from DC signal between 0 to 5V DA converter output

RH,BH,GH : Generate DC signal between 1.89 to 2.89 from DC signal between 0 to 5V DA converter output

8. Power block (Page 12)

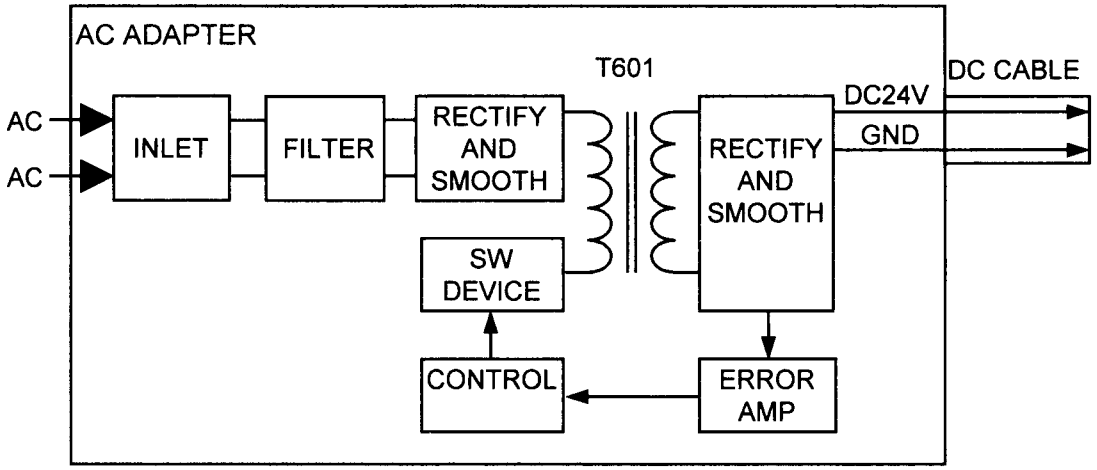
IC37 : Series regulator
generates 3.3V from 5V

IC32 : Series regulator
generates 18V from 24V

Q16,Q14 : control 5V output
Control 5V output to keep power sequence of LCD module

Q17,Q18,Q19 : control -5V output
Control -5V output put to keep power sequence of LCD module

9. AC ADAPTER CIRCUIT



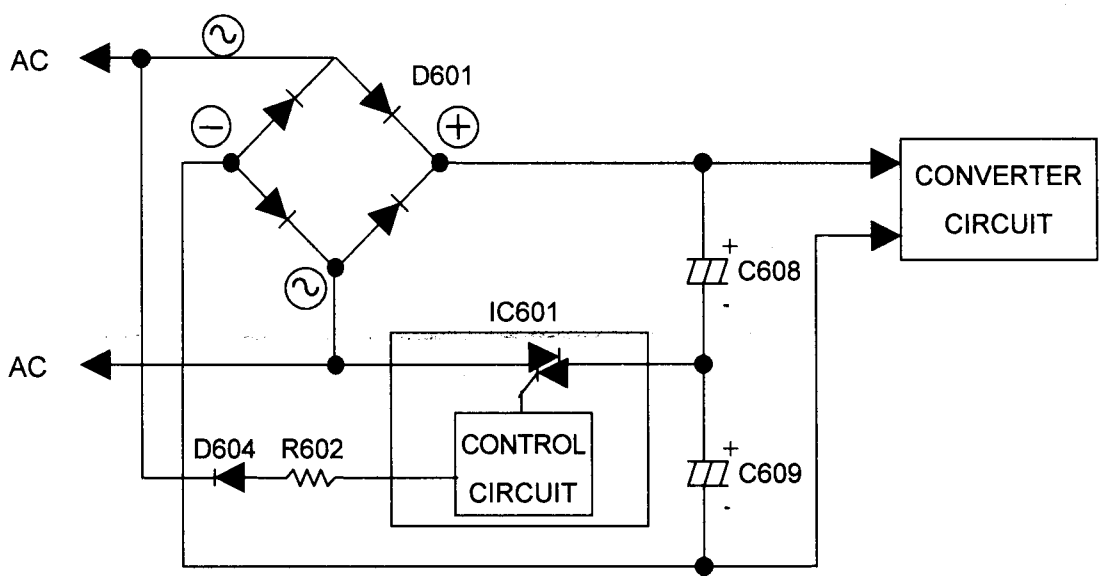
9.1 Rectifying and Smoothing Circuit

AC input is rectified by D601, and smoothed by C608 and C609. The resulting DC voltage is supplied to the converter circuit.

AC input is sensed through D604 and R602, and the smoothing circuit is changed in accordance with AC input voltage.

When AC input voltage is 100/120VAC, triac within automatic voltage-doubler switch IC(IC601) turns on. (Doubler rectifying)

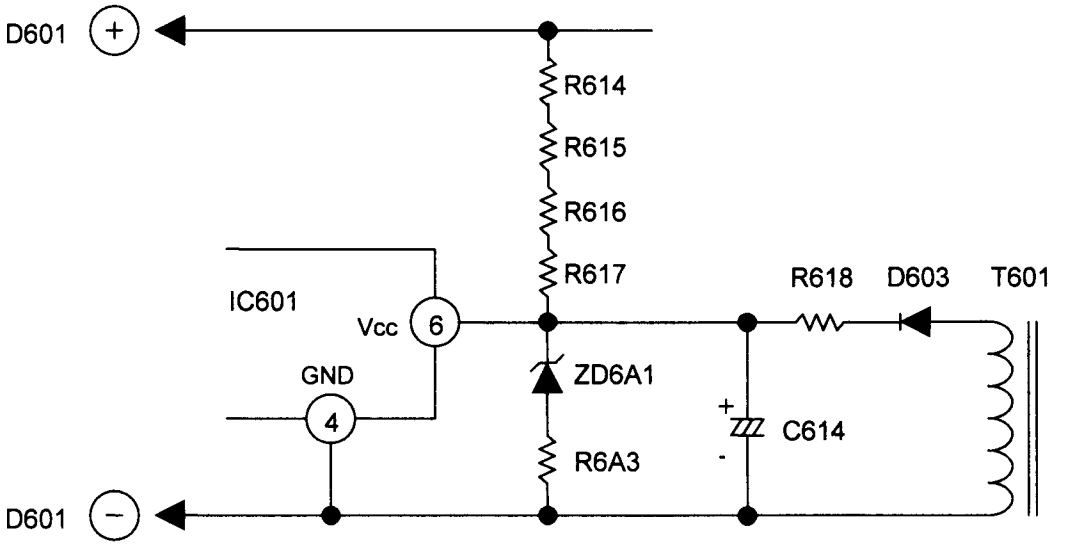
When AC input voltage is 220/240VAC, triac within IC601 does not turn on. (Bridge rectifying)



(Fig. 9-1) Rectifying and Smoothing Circuit

9.2 Auxiliary Power Supply Circuit

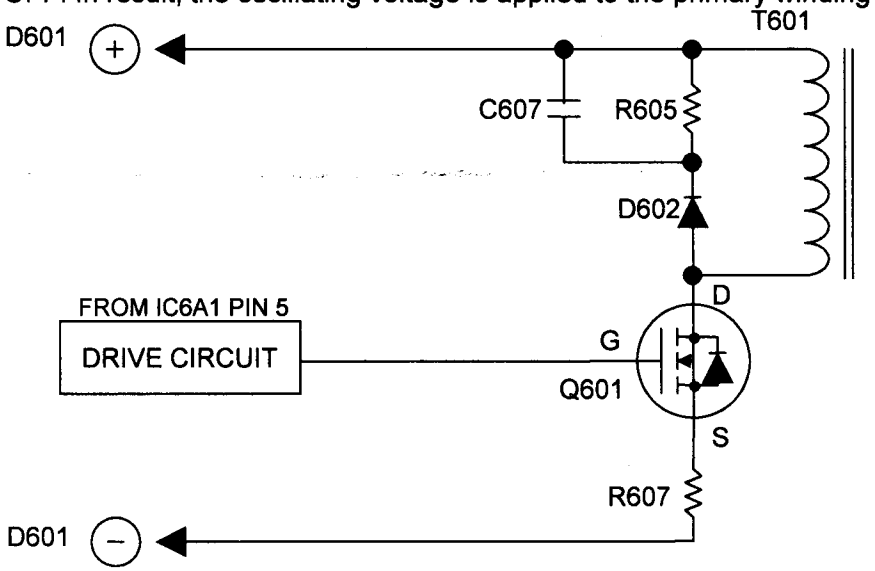
The auxiliary power supply circuit is needed to activate IC601. When the AC is supplied, the charging current flows into the capacitor C614 through R614, R615, R616 and R617. Oscillation starts when the voltage of IC601 pin6 reaches 16V by this charging operation. After the start of oscillation, the fly-back voltage of the auxiliary winding of T601 is rectified and smoothed by D603 and C614. The resulting DC voltage is supplied to IC601 pin6.



(Fig. 9-2) Auxiliary Power Supply Circuit

9.3 Converter Circuit

The converter circuit consists of the primary winding of T601, the switching device Q601 and surge absorbers (C607,R605 and D602) which are connected to the primary winding of T601. The oscillating signal from IC601 pin5 is applied to the gate of Q601 so that the drain-source is turned ON and OFF. In result, the oscillating voltage is applied to the primary winding of T601.

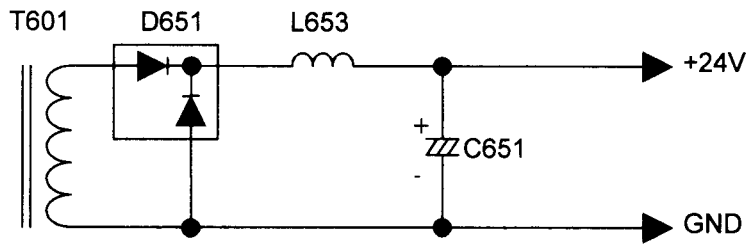


(Fig. 9-3) Converter Circuit

9.4 Output Rectifying and Smoothing Circuit

The converted voltage which are generated at the secondary windings of T601 are rectified by D651. This voltage is smoothed by L653 and C651, so that DC voltages is obtained.

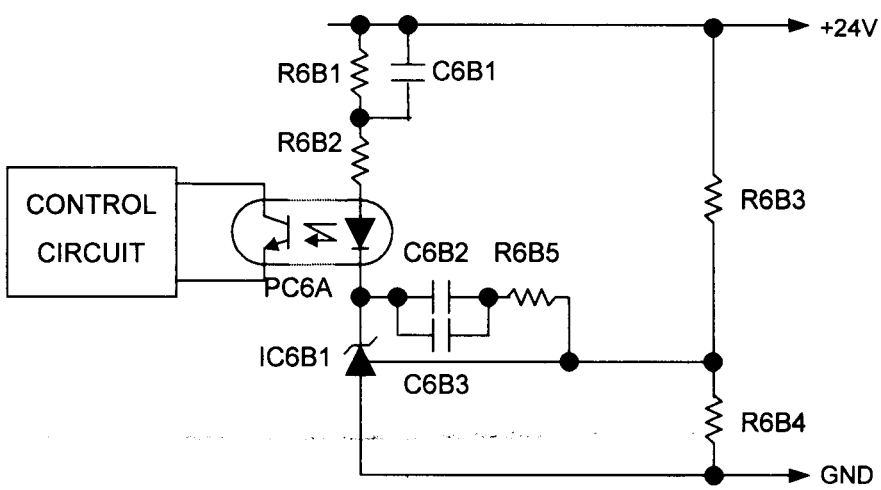
The DC voltages is maintained constantly by controlling the ON period duty cycle of Q601 in the converter circuit.



(Fig. 9-4) Output Rectifying and smoothing Circuit

9.5 Error Detection Amplifier Circuit

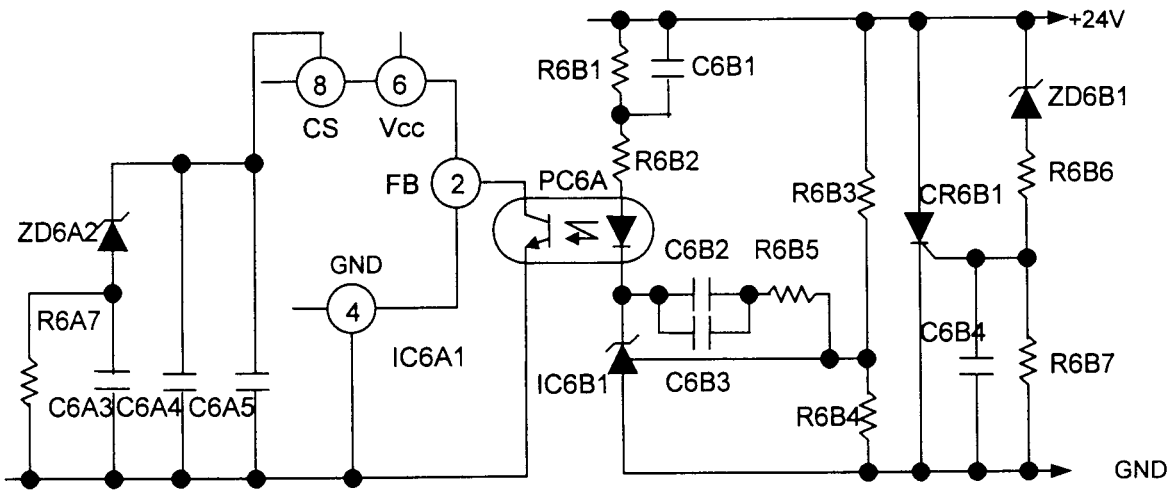
The output voltage of 24V is divided by the network resistors. This divided voltage is compared with the reference voltage at the error amplifier IC6B1. An error signal is applied to the control circuit via the photocoupler PC6A1.



(Fig. 9-5) Error Detection Amplifier Circuit

9.6 Over voltage Protection

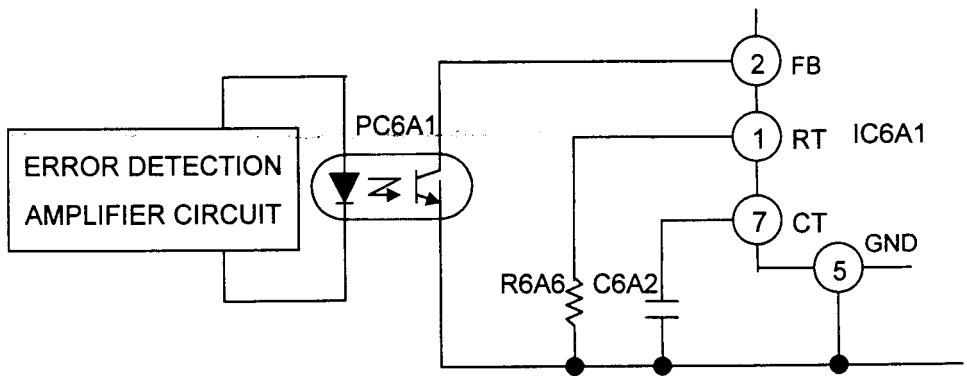
If some failure occurs and the output voltage of C609 increases beyond the zener voltage of ZD6B1, thyrister CR6B1 activates and output circuit is shorted. This action will increase feedback voltage IC6A1 pin2. If feedback voltage exceeds the threshold voltage 2.8V, CS terminal voltage increases by the internal current source. When CS terminal exceeds 7.0V, IC601 latches and stops the oscillator within it until Vcc voltage IC601 pni6 becomes less than 8.7V.



(Fig. 9-6) Over voltage Protection

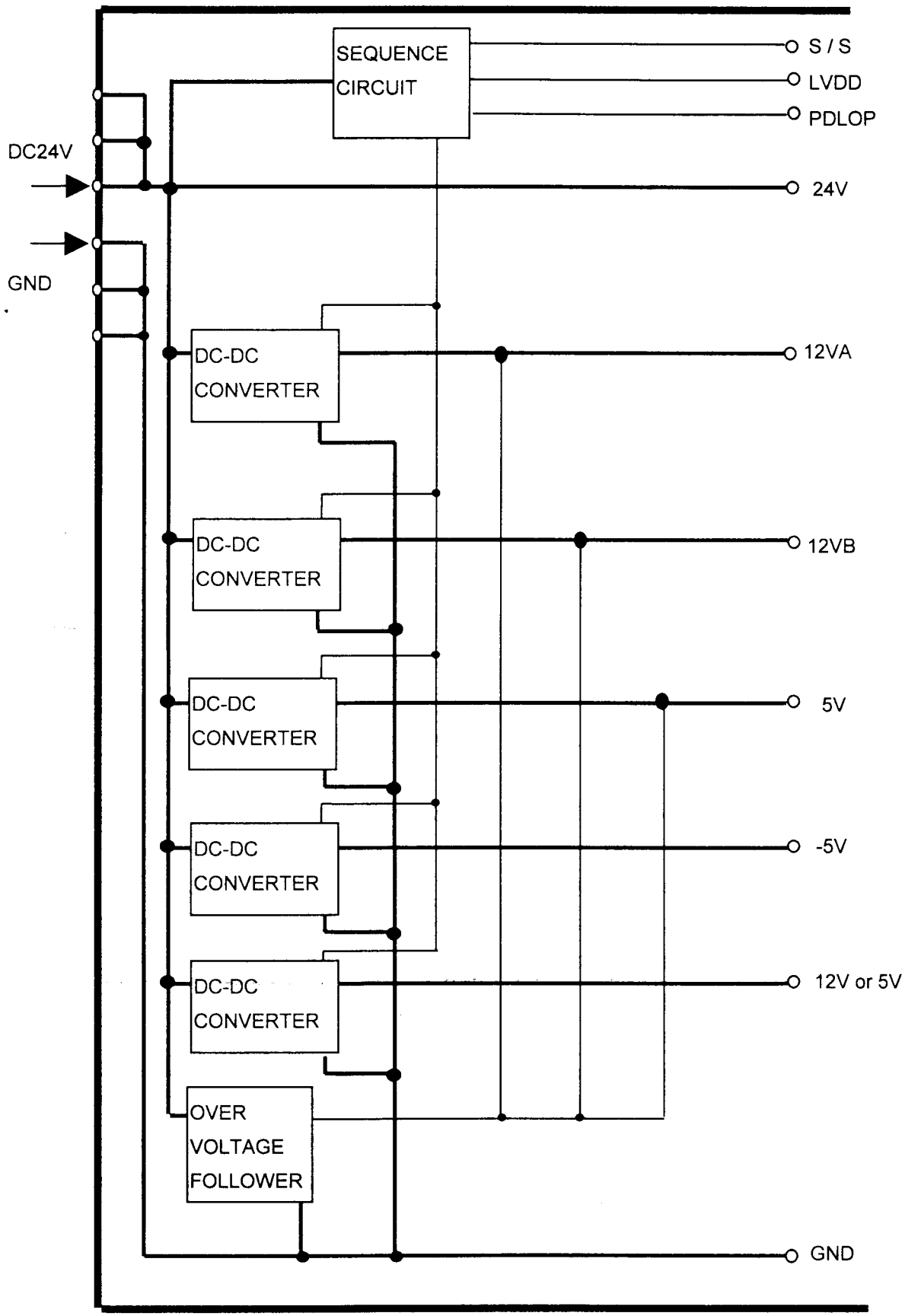
9.7 Oscillating and Control Circuit

The oscillating and control circuits are contained in IC601. IC601 has a built-in oscillator whose frequency is determined by R6A6 and C6A2 which are connected to pin1 and pin7 respectively. When the output of the error detection amplifier circuit is fed back to IC601 pin2 via PC6A1 to control the duty cycle of Q601. In result, the output voltage is kept constant.

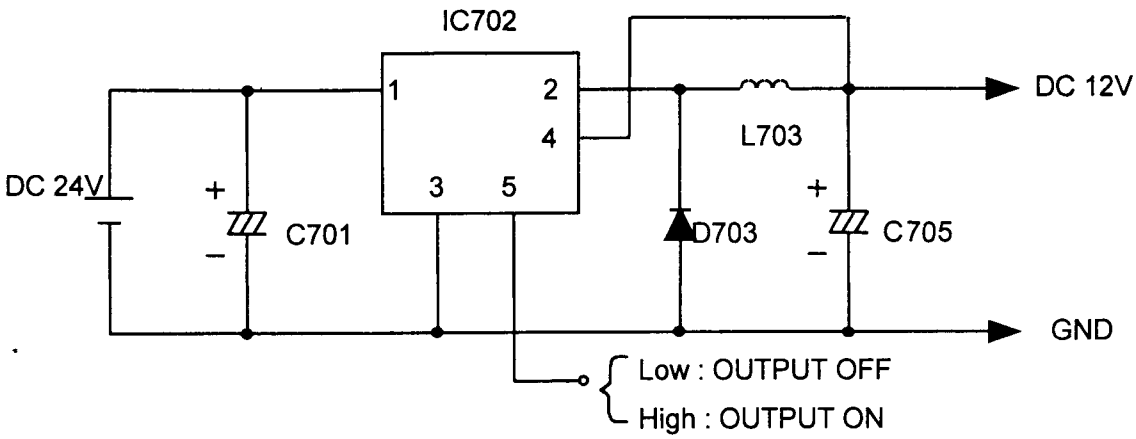


(Fig. 9-7) Oscillating and Control Circuit

10.DC-DC CONVERTER



10 .1 DC-DC CONVERTER (12VA,5V)



(Fig. 10-1) DC-DC CONVERTER CIRCUIT

"12V(A) and 5V outputs" are much the same circuit composition,
so "12V(A) output" is only explained in this section.
DC-DC converter consists of transistor in IC702, diode D703, choke coil L703 and capacitors C701 and C705.Transistor in IC702 is turned ON and supplied energies in L703 and C705,so DC voltage is obtained. At this time L703 is charged with magnetic energy.
When transistor in IC702 is turned OFF, L703 discharges its energy
by way of D702.
The DC voltage is maintained constantly by controlling the ON period duty
cycle of transistor in IC702.
This IC has two kinds of protection.
One protection is over current protection. If some failure occurs and the output current increases more than 3A, output voltage decreases to 0V because of the limit of this IC's output current ability.
This protection is maintained until output current decreases less than 3A.
The other protection is thermal protection. If some failure occurs and the temperature of this IC rises more than 170℃, output voltage decreases to 0V.
This protection is maintained until the temperature of this IC falls less than 150℃.
"-5V and 12V or 5V outputs" are much the same circuit composition, and these circuits act as same as "12V(A) and 5V outputs".
This IC has two kinds of protection.
One protection is over current protection. If some failure occurs and the output current increases more than 1.5A, output voltage decreases to 0V because of the limit of this IC's

output current ability.

This protection is maintained until output current decreases less than 1.5A.

The other protection is thermal protection. If some failure occurs and the temperature of this IC rises more than 150℃, output voltage decreases to 0V.

This protection is maintained until the temperature of this IC falls less than 80℃.

REPLACEMENT PARTS LIST

The components specified for Model LA-1831JMW(A)

Note: The components identified by ▲ make are critical for safety.
Replace only with parts Number specified.

A Version

SYMBOL	PARTS NO	DESCRIPTION
*** ICS ***		
IC38	37R56278	MOS UPD65943GJ-E00-JEU
IC8	37R56281	MOS M35046-061FP
IC13	37R56287	MOS UPD78018FYGC-AB8
	37R56295	MOS M35072-053FP
	37R56299	MOS UPD78P018FYGC-CN750A3
IC2 IC42 IC6	370AA016	IC OPA2658U-T2
IC21	370AA049	IC UPC842G2-E1
IC43 IC44 IC45	370AA072	IC AD835AR-REEL7
IC681	370A1009	IC UPC1093J-T (REG)
IC27 IC28 IC48	370A1073	IC BA10324AF-T1 (OP-AMP)
IC502 IC7	370EB047	IC SN74CBT3125PW-ELL2
IC19	370EB051	IC UPB1509GV-E1
IC46	370ED003	MOS 24LCS21AT/SN
IC10	370ED005	MOS CAT24WC08J-LE10
IC34 IC35	370EF011	IC M62353FP-75ND
VCO1	370EF022	IC JTOS-300-3-TR
IC50	370EF024	MOS TC7S32F-EL
IC24	370EF034	IC AD8561AR-REEL7
IC12	370E2064	IC MC74F14ML
IC3	370E3339	MOS SN74CBT3384
IC9	370E6088	IC M51953AFP-T2
IC26	370E6159	IC MC10H116ML1 (RECEIVER)
IC751 IC761	370KE019	IC PQ1CZ1T
IC37	370KE033	IC UPC29M33T-E1
IC41	370KE034	IC UPC29M05T-E1
IC32	370KE038	IC BA17818FP-E2(REG)
IC5	370K0005	IC UPC78L05T-E2
IC501	370K0006	IC UPC1093T-E2
IC601	37005322	IC MK1210(4105)
IC6A1	37005324	IC FA5310P
IC701	37005325	IC FA7612CP
IC703	37005342	IC SI-8050S (LF-L)
IC702	37005343	IC SI-8120S (LF-L)
IC704	37056615	IC BA10393

SYMBOL	PARTS NO	DESCRIPTION
ZD701	36BB0145	DIODE RD20MB1-T2B(180°)
ZD501 ZD502 ZD503 ZD504 ZD505 ZD506 ZD507 ZD508	36BB0638	DIODE RD5.6S B2-T1
D751 SBD1	36CB0051	DIODE SB20-03P-TD
D502 D505 D508	36CB0079	DIODE DAN202K-T146(0°)
D604	36CB0089	DIODE D2F60(4073)
D761	36CB0090	DIODE SB20-05P-TD
D501 D503 D504 D506 D507 D509	36CB0203	DIODE DAN217-T146
D603	36CB0227	DIODE D1FL20U
LED401	36EB0003	LED LN2162C34-(TR)
ZD6A2	360KC634	DIODE RD5.1ESB(1)-T1
D705 D707 D708	360K1049	DIODE 1SS270A TA
ZD707	360K3158	DIODE,RD5.6EB(3)-T4
ZD708	360K3161	DIODE RD12EB(2)-T4
ZD6A2	360K3634	DIODE RD5.1ESB(1)-T4
ZD6A1	360K3705	DIODE RD27ESB(2)/ESAB(2)
ZD6B1	360K3711	DIODE RD30ESB(3)/ESAB(3)
D6A1	361KG822	DIODE D1NL20,AT26
D602	361K7174	DIODE RU1P V1
D6A1	361K7822	DIODE D1NL20,AT52
D601	36107783	DIODE KBL405G-FA1
D651	36107821	DIODE D10LC20U
D703 D704	36107830	DIODE RK34(LF-C1)
D702	36107847	DI D10SC4M(4022)
	36804245	LCD NL128102AC28-01
PC6A1	38200354	PHOTOCOUPLER PC123FY2
*** TRANSFORMERS ***		
T601	46309613	SWITCHING TRANS W514A
T701	46399602	CAREN TRANS CT2420S-05
*** VARIABLE RESISTORS ***		
VR701	410G2251	R,VARIABLE B100H

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS ***		
Q514 Q515	35AB0011	TR 2SA812-T1B M5
Q10 Q21 Q508	35AB0012	TR 2SA812-T1B M6
Q509 Q9		
Q42	35AB0312	TR 2SA1037AK-T146 Q
Q7	35AB1592	TR 2SA1434-TB
Q704	35BB1017	TR 2SB806-T2 KQ
Q507 Q901	35CB0015	TR 2SC1623-T2B(180°) L5
Q1 Q2 Q29	35CB0123	TR 2SC3734-T2B(180°) B23
Q3 Q36 Q37		
Q38 Q501 Q502		
Q503 Q504 Q505		
Q506 Q511 Q702		
Q711		
Q709	35DB0317	TR 2SD1007-T2 HQ
Q714 Q715 Q716	35EB0001	TR FA1A4P-T2B(180°)
Q717		
Q18 Q22 Q31	35EB0205	TR DTA144EKA-T146(0°)
Q32 Q45		
Q23 Q30 Q33	35EB0232	TR DTC144EKA-T146(0°)
Q34 Q35 Q46		
Q516		
Q39 Q510 Q512	35EB0242	TR DTC114TKA-T146
Q513		
Q16 Q17 Q24	35EB0247	TR DTC143ZKA-T146
Q26 Q28 Q40		
Q41		
Q19	35KB2490	TR 2SK1959-T1
Q14 Q25 Q27	35KB2491	TR 2SJ356-T1
Q43 Q44	35KB2498	TR 2SK3018-T106
Q701	350K3516	TR 2SA733/2SA733A-T P
Q601	35127950	TR 2SK2611
Q703	35128022	TR 2SJ292(LF-B)
CR6B1 CR701	35595023	SCR 5P4J
*** DIODES ***		
ZD706	36BB0094	DIODE RD4.7MB2-T2B(180°)
ZD761	36BB0099	DIODE RD5.6MB-T2B(180°)
ZD705	36BB0102	DIODE RD5.6MB3-T2B(180°)
ZD702 ZD710 ZD711	36BB0122	DIODE RD10MB2-T2B(180°)
ZD703 ZD704	36BB0131	DIODE RD13MB1-T2B(180°)

SYMBOL	PARTS NO	DESCRIPTION
*** RELAYS & SWITCHES ***		
SW401 SW402 SW403 SW404 SW405 SW406 SW407 SW408 SW409	653F0054	TACT SWITCH SKHMPS
*** COILS & FILTERS ***		
MR1 MR2	39KC1037	R,NETWORK 1.0K 5% 1/16W
MR3	39KC1049	R,NETWORK 10K 5% 1/16W
LC1D	61FK6584	FILTER,NOISE
L1 L15 L16 L19 L21 L24 L27 L28 L32 L33 L34 L35 L36 L37 L41 L42 L43 L501 L762	61KG0428	CHIP COIL (BLM21P300SPT)
L707	610F3023	COIL,FILTER 33UH
L702	610G0125	BEADS INDUCTER
L751 L761	610G0323	CHOKECOIL TSL0709-331KR36
L602 L651 L652	610J9021	COIL BEADS (ZBF503D-00TA)
L708		
FL602	61062252	COIL,FILTER(SS11V-R17036)
FL501	61062253	COIL,FILTER(CM08RA20)
FL651	61062260	LINE FILTER(CM08RA27)
FL601	61062261	LINE FILTER(SS28V-R15170)
L601	61070328	COIL,CHOKE(TS15)
L653	61099152	COIL,CHOKE HP-054SZ
L701	61099162	COIL,CHOKE 120UH
L703 L705	61099163	COIL,CHOKE 300UH
*** PWB ASSYS ***		
	846A4A03	SW MAIN PWB ASSY
	846A4B01	SW SUB PWB ASSY
	847A9103	MAIN PWB ASSY
	847A9202	CN PWB ASSY
	847A9301	CTRL PWB ASSY
	847A9801	DC-DC CONV. ASSY

SYMBOL	PARTS NO	DESCRIPTION
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HQ602	31709806	TUBE INSULATOR 45T-17-25L
HQ601	31709807	CASE INSU 50T-TO3P-02275
	32990205	INSULATING CAP TIC-3.5(YE
OSC1	64KA0294	OSC 10.000MHZ(JXO-5F)
F501	66671019	FUSE5AT 250V SEMKO 20MM
	866A4101	AC ADAPTER
F601	66671039	FUSE 250V 3.15A(215)
CN501	70051847	DC SOCKET TCS7960-43-2010
CN503	70056490	D-SUBSOCKET15PL(GMA-X15UG
	70521072	INLET AC-016-B-200
CABLE2	70810780	POWER CORD UC3 L1.8 GRY
	73891183	DC CABLE
CABLE1	73893256	SIGNAL CABLE MD15-MD15 K
	79696823	PORTRAIT DRIVER(CD-ROM)
*** APPEARANCE PARTS ***		
	25429841	LENS
	25429951	COVER T,AC ADAPTER
	25429971	COVER B,AC ADAPTER
	25765841	LABEL(1*10)
	25786161	LABEL(TCO95)
	25788191	NAME PLATE,INST.(ADAPTER)
	25851381	SCREW,SPECIAL(LH)
*** PRINTED & PACKING MATERIALS ***		
	24807261	BAG,POLYETHYLENE(220*320)
	25831362	BAG,POLYETHYLENE(900X900)
	25835221	BAG,PROTECTION(160*300)
	78133811	CN750(A) MANUAL
*** RESISTORS ***		
R709	40AAD173	R,CHIP 1.0K 5% 1/2W
R723	40AAD183	R,CHIP 2.7K 5% 1/2W
R713	40AA2129	R,CHIP 15H 5% 1/4W
R391	40AA2153	R,CHIP 150H 5% 1/4W
R1 R2 R3	40AA2155	R,CHIP 180H 5% 1/4W
R6B1 R6B2	40AA2181	R,CHIP 2.2K 5% 1/4W
R614 R615 R616	40AA2215	R,CHIP 56K 5% 1/4W
R617		

SYMBOL	PARTS NO	DESCRIPTION
L30 L31 L39	40AA9000	R,CHIP 0.0H 5% 1/16W
R221 R313 R411		
R422 R423 R424		
R433 R434		
R48	40AA9125	R,METAL 10H 5% 1/16W
R219 R220	40AA9133	R,METAL 22H 5% 1/16W
R74	40AA9135	R,METAL 27H 5% 1/16W
R168 R176 R350	40AA9137	R,METAL 33H 5% 1/16W
R380 R386 R387		
R388 R389 R449		
R60 R61 R62		
R71 R80 R88		
R377 R379 R415	40AA9141	R,METAL 47H 5% 1/16W
R416 R47		
R29 R30 R31	40AA9142	R,METAL 51H 5% 1/16W
R160	40AA9145	R,METAL 68H 5% 1/16W
R167 R238 R297	40AA9149	R,CHIP 100H 5% 1/16W
R298 R299		
R288 R85	40AA9155	R,METAL 180H 5% 1/16W
R356	40AA9156	R,METAL 200H 5% 1/16W
R10 R316 R319	40AA9157	R,METAL 220H 5% 1/16W
R322		
R50	40AA9161	R,METAL 330H 5% 1/16W
R208 R349 R426	40AA9166	R,METAL 510H 5% 1/16W
R15 R158 R159	40AA9173	R,METAL 1.0K 5% 1/16W
R341 R360 R363		
R365		
R183	40AA9175	R,METAL 1.2K 5% 1/16W
R315 R318 R321	40AA9181	R,METAL 2.2K 5% 1/16W
R325 R327 R329		
R57	40AA9182	R,METAL 2.4K 5% 1/16W
R11 R22 R24	40AA9183	R,METAL 2.7K 5% 1/16W
R72 R73 R81		
R82 R83 R84		
R324 R326 R328	40AA9187	R,METAL 3.9K 5% 1/16W
R438 R439 R440	40AA9189	R,METAL 4.7K 5% 1/16W
R441 R442 R443		
R444 R445 R446		
R447 R448 R58		
R59		
R156 R157 R173	40AA9193	R,METAL 6.8K 5% 1/16W

SYMBOL	PARTS NO	DESCRIPTION
R610 R611 R612	40AA2221	R,CHIP 100K 5% 1/4W
R613		
R601 R604	40AA2229	R,CHIP 220K 5% 1/4W
L20 L25 R406	40AA3000	R,CHIP 0.0H 5% 1/10W
R407 R408		
R6A2 R734 R735	40AA3125	R,CHIP 10H 5% 1/10W
R736		
R545 R551 R552	40AA3137	R,CHIP 33H 5% 1/10W
R553 R554		
R502 R508 R514	40AA3149	R,CHIP 100H 5% 1/10W
R520 R526 R532		
R547 R559		
R6B6 R748	40AA3151	R,CHIP 120H 5% 1/10W
R6B5	40AA3157	R,CHIP 220H 5% 1/10W
R538	40AA3159	R,CHIP 270H 5% 1/10W
R549 R550	40AA3161	R,CHIP 330H 5% 1/10W
R6A3 R745	40AA3165	R,CHIP 470H 5% 1/10W
R753 R901	40AA3166	R,CHIP 510H 5% 1/10W
R6B7 R737 R752	40AA3173	R,CHIP 1.0K 5% 1/10W
R711 R742	40AA3177	R,CHIP 1.5K 5% 1/10W
R555 R557	40AA3182	R,CHIP 2.4K 5% 1/10W
R751	40AA3184	R,CHIP 3.0K 5% 1/10W
R746	40AA3189	R,CHIP 4.7K 5% 1/10W
R764	40AA3191	R,CHIP 5.6K 5% 1/10W
R6A6	40AA3192	R,CHIP 6.2K 5% 1/10W
R505 R512 R517	40AA3197	R,CHIP 10K 5% 1/10W
R524 R529 R536		
R537 R701 R712		
R722 R730 R744		
R539 R543 R556	40AA3205	R,CHIP 22K 5% 1/10W
R558		
R560 R721 R754	40AA3213	R,CHIP 47K 5% 1/10W
R541 R544	40AA3214	R,CHIP 51K 5% 1/10W
R703	40AA3215	R,CHIP 56K 5% 1/10W
R609 R702 R720	40AA3221	R,CHIP 100K 5% 1/10W
R726 R738		
R739 R740	40AA3231	R,CHIP 270K 5% 1/10W
R6A7	40AA3245	R,CHIP 1.0M 5% 1/10W
R724	40AA3249	R,CHIP 1.5M 5% 1/10W
R741	40AA5129	R,CHIP 15H 5% 1/4W

SYMBOL	PARTS NO	DESCRIPTION
R37 R902 R903	40AA9193	R,METAL 6.8K 5% 1/16W
R212 R310 R344	40AA9197	R,METAL 10K 5% 1/16W
R345 R351 R359		
R361 R362 R364		
R366 R367 R368		
R369 R370 R371		
R373 R374 R381		
R390 R392 R393		
R417 R418 R419		
R420 R9		
R171 R172	40AA9198	R,METAL 11K 5% 1/16W
R353 R6	40AA9204	R,METAL 20K 5% 1/16W
R296 R376	40AA9207	R,METAL 27K 5% 1/16W
R16 R19 R21	40AA9209	R,METAL 33K 5% 1/16W
R257 R352 R354		
R7 R8		
R211 R342 R375	40AA9213	R,METAL 47K 5% 1/16W
R12 R140 R141	40AA9214	R,METAL 51K 5% 1/16W
R143 R149 R245		
R247 R248 R252		
R253 R272 R357		
R17 R18 R20	40AA9217	R,METAL 68K 5% 1/16W
R338 R355 R358		
R343	40AA9221	R,METAL 100K 5% 1/16W
R49	40AA9227	R,METAL 180K 5% 1/16W
R161 R162	40AA9229	R,METAL 220K 5% 1/16W
R506 R511 R518	40AB2131	R,CHIP 18H 1% 1/4W
R523 R530 R535		
R503 R509 R515	40AB2145	R,CHIP 68H 1% 1/4W
R521 R527 R533		
R6A4	40AB3155	R,CHIP 180H 1% 1/10W
R6A5	40AB3159	R,CHIP 270H 1% 1/10W
R705	40AB3166	R,CHIP 510H 1% 1/10W
R501 R507 R513	40AB3171	R,CHIP 820H 1% 1/10W
R519 R525 R531		
R540		
R542	40AB3177	R,CHIP 1.5K 1% 1/10W
R504 R510 R516	40AB3181	R,CHIP 2.2K 1% 1/10W
R522 R528 R534		
R763		
R6B4	40AB3183	R,CHIP 2.7K 1% 1/10W

SYMBOL			PARTS NO	DESCRIPTION
R762			40AB3198	R,CHIP 11K 1% 1/10W
R704			40AB3199	R,CHIP 12K 1% 1/10W
R683			40AB3206	R,CHIP 24K 1% 1/10W
R708	R761		40AB3209	R,CHIP 33K 1% 1/10W
R706			40AB3227	R,CHIP 180K 1% 1/10W
R707			40AB3233	R,CHIP 330K 1% 1/10W
R4	R44	R45	40AB9145	R,METAL 68H 1% 1/16W
R46				
R32	R33	R34	40AB9146	R,METAL 75H 1% 1/16W
R52	R54	R56	40AB9149	R,METAL 100H 1% 1/16W
R307			40AB9157	R,METAL 220H 1% 1/16W
R51	R53	R55	40AB9164	R,METAL 430 1% 1/16W
R306			40AB9166	R,METAL 510H 1% 1/16W
R39			40AB9169	R,METAL 680H 1% 1/16W
R35	R36	R38	40AB9177	R,METAL 1.5K 1% 1/16W
R40	R41	R42		
R43				
R135	R177		40AB9194	R,METAL 7.5K 1% 1/16W
R145	R151	R155	40AB9198	R,METAL 11K 1% 1/16W
R189	R195	R196		
R205	R206	R235		
R239	R25			
R311	R437		40AB9199	R,METAL 12K 1% 1/16W
R262	R436		40AB9203	C,METAL 18K 1% 1/16W
R136	R184	R312	40AB9206	R,METAL 24K 1% 1/16W
R261	R429		40AB9209	R,METAL 33K 1% 1/16WJ
R276			40AB9211	R,METAL 39K 1% 1/16WJ
R144	R147	R150	40AB9214	R,METAL 51K 1% 1/16W
R23	R240	R260		
R277	R279	R284		
R285	R286	R427		
R428				
R6A1			401C6649	R,CARBON 100H 5% 1/4W
R602			40299183	R,WIRE 150H 5% 2W
R603			40371113	R,METAL 3.3H 5% 1W
R605			40372221	R,METAL 100K 5% 2W
R618			40405125	R,METAL 10H 5% 1/4W
R607			40499013	R,METAL 0.33H 10% 2W

SYMBOL			PARTS NO	DESCRIPTION
C140	C141	C180	42AG0530	C,CHIP 50V 1000PF
C181	C182	C78		
C53			42AG0564	C,CHIP 16V 0.068UF
C6A2			42CA1456	C,CERAMIC 50V 470PF
C721	C723		42CA1464	C,CERAMIC 50V 1000PF
C191	C74	C86	42CD0137	C,CHIP 50V 100PF
C118	C119	C76	42HA9013	C,FILM 50V 0.22UF
C77				
C656	C657		420D2004	C,CERAMIC 250V 680PF
C736			420D2007	C,CERAMIC 250V 2200PF
C603	C604		420FK113	C,CERAMIC 250V 1000PF
C606			42060267	C,CERAMIC 250V 2200PF
C607			42098068	C,CERAMIC 2200PF 1KV 10%
C601	C605		42824913	C,FILM 250V 0.1UF(R.40)
C602			42826202	C,FILM 250V 0.22UF
C613			42840225	C,METAL 630V 0.022UF
C12	C15	C16	43CC1321	C,ELEC 6.3V 22UF
C17	C178	C8		
C9				
C122			43KB7466	C,ELEC 35V 33UF
C195	C27		43KB7915	C,ELEC 16V 10UF
C38			43KB7918	C,ELEC 16V 47UF
C121	C123	C136	43KB7919	C,ELEC 16V 100UF
C175				
C174			43KB7927	C,ELEC 35V 22UF
C722			430B6028	C,ELEC 16V 47UF
C734			430B6068	C,ELEC 50V 47UF
C515			430B8152	C,ELEC 25V 10UF
C761			430B8163	C,ELEC 35V 22UF
C735			430B9061	C,ELEC 50V 1.0UF
C751	C762		430C6126	C,ELEC 16V 470UF
C707			430C8522	C,ELEC 25V 330UF
C705			430C8523	C,ELEC 25V 470UF
C614			430D9059	C,ELEC 50V 47UF
C702	C703	C708	430F1169	C,ELEC 25V 470UF
C709				
C611			430J9239	C,ELEC 400V 4.7UF
C610			430J9244	C,ELEC 16V 10UF
C701	C704		4303B388	C,ELEC 35V 470UF
C651			43049048	C,ELEC 35V 1000UF

SYMBOL			PARTS NO	DESCRIPTION
*** CAPACITORS ***				
C724			42AA1125	C,CERAMIC 50V 0.022UF
C6A3	C6A4	C6A5	42AA1133	C,CERAMIC 50V 0.1
C653	C654	C655		
C726				
C139			42AA1516	C,CHIP CERAMIC 50V 3900PF
C6A1			42AA1521	C,CHIP CERAMIC 50V 0.01UF
C729			42AA1524	C,CHIP CERAMIC 50V0/018UF
C39			42AA1538	C,CERAMIC 25V 0.1UF
C727			42AA2139	C,CHIP 50V 0.47UF
C114	C179	C183	42AA2721	C,CERAMIC 50V 0.1UF
C28	C6B1	C682		
C6B3	C6B4	C612		
C730	C731	C732		
C733	C752	C763		
C107	C128	C130	42AA2744	C,CERAMIC 25V 0.1UF
C135	C144	C145		
C154	C155	C165		
C166	C186	C187		
C188	C189	C190		
C196	C21	C22		
C23	C24	C25		
C26	C30	C31		
C32	C34	C35		
C36	C41	C50		
C501	C503	C505		
C507	C509	C51		
C511	C513	C514		
C52	C522	C54		
C55	C59	C60		
C61	C62	C63		
C71	C72	C73		
C81	C82	C90		
C94				
C40			42AA2754	C,CERAMIC 16V 1UF
C37			42AG0517	C,CHIP 50V 4700PF
C29			42AG0519	C,CHIP 50V 6800PF
C728			42AG0520	C,CHIP 50V 8200PF
C110	C111		42AG0521	C,CHIP 50V 0.01UF
C102	C42	C43	42AG0524	C,CHIP 25V 0.01UF
C44	C45	C46		
C47	C48			

SYMBOL			PARTS NO	DESCRIPTION
C608	C609		43199114	C,ELEC 200V 470UF
C502	C504	C506	433A6147	C,ELEC 16V 47UF
C508	C510	C512		

REPLACEMENT PARTS LIST

The components specified for Model LA-1831JMW(B)

Note: The components identified by ▲ make are critical for safety.
Replace only with parts Number specified.

B Version

SYMBOL	PARTS NO	DESCRIPTION
*** ICS ***		
IC38	37R56278	MOS UPD65943GJ-E00-JEU
IC8	37R56281	MOS M35046-061FP
IC13	37R56287	MOS UPD78018FYGC-AB8
	37R56295	MOS M35072-053FP
	37R56299	MOS UPD78P018FYGC-CN750A3
IC2 IC42 IC6	370AA016	IC OPA2658U-T2
IC21	370AA049	IC UPC842G2-E1
IC43 IC44 IC45	370AA072	IC AD835AR-REEL7
IC681	370A1009	IC UPC1093J-T (REG)
IC27 • IC28 IC48	370A1073	IC BA10324AF-T1 (OP-AMP)
IC502 IC7	370EB047	IC SN74CBT3125PW-ELL2
IC19	370EB051	IC UPB1509GV-E1
IC46	370ED003	MOS 24LCS21AT/SN
IC10	370ED005	MOS CAT24WC08J-LE10
IC34 IC35	370EF011	IC M62353FP-75ND
VCO1	370EF022	IC JTOS-300-3-TR
IC50	370EF024	MOS TC7S32F-EL
IC24	370EF034	IC AD8561AR-REEL7
IC12	370E2064	IC MC74F14ML
IC3	370E3339	MOS SN74CBT3384
IC9	370E6088	IC M51953AFP-T2
IC26	370E6159	IC MC10H116ML1 (RECEIVER)
IC751 IC761	370KE019	IC PQ1CZ1T
IC37	370KE033	IC UPC29M33T-E1
IC41	370KE034	IC UPC29M05T-E1
IC32	370KE038	IC BA17818FP-E2(REG)
IC5	370K0005	IC UPC78L05T-E2
IC501	370K0006	IC UPC1093T-E2
IC601	37005322	IC MK1210(4105)
IC6A1	37005324	IC FA5310P
IC701	37005325	IC FA7612CP
IC703	37005342	IC S1-8050S (LF-L)
IC702	37005343	IC S1-8120S (LF-L)
IC704	37056615	IC BA10393

SYMBOL	PARTS NO	DESCRIPTION
ZD701	36BB0145	DIODE RD20MB1-T2B(180°)
ZD501 ZD502 ZD503 ZD504 ZD505 ZD506 ZD507 ZD508	36BB0638	DIODE RD5.6S B2-T1
D751 SBD1	36CB0051	DIODE SB20-03P-TD
D502 D505 D508	36CB0079	DIODE DAN202K-T146(0°)
D604	36CB0089	DIODE D2F60(4073)
D761	36CB0090	DIODE SB20-05P-TD
D501 D503 D504 D506 D507 D509	36CB0203	DIODE DAN217-T146
D603	36CB0227	DIODE D1FL20U
LED401	36EB0003	LED LN2162C34-(TR)
ZD6A2	360KC534	DIODE RD5.1ESB(1)-T1
D705 D707 D708 ZD707 ZD708 ZD6A2 ZD6A1	360K1049	DIODE 1SS270A TA
	360K3158	DIODE RD5.6EB(3)-T4
	360K3161	DIODE RD12EB(2)-T4
	360K3634	DIODE RD5.1ESB(1)-T4
	360K3705	DIODE RD27ESB(2)/ESAB(2)
ZD6B1	360K3711	DIODE RD30ESB(3)/ESAB(3)
D6A1	361KG822	DIODE D1NL20,AT26
D602	361K7174	DIODE RU1P V1
D6A1	361K7822	DIODE D1NL20,AT52
D601	36107783	DIODE KBL405G-FA1
D651	36107821	DIODE D10LC20U
D703 D704	36107830	DIODE RK34(LF-C1)
D702	36107847	DI D10SC4M(4022)
	36804245	LCD NL128102AC28-01
PC6A1	38200354	PHOTOCOUPLER PC123FY2
*** TRANSFORMERS ***		
T601	46309613	SWITCHING TRANS W514A
T701	46399602	CAREN TRANS CT2420S-05
*** VARIABLE RESISTORS ***		
VR701	410G2251	R,VARIABLE B100H

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS ***		
Q514 Q515 Q10 Q21 Q508 Q509 Q9 Q42	35AB0011	TR 2SA812-T1B M5
	35AB0012	TR 2SA812-T1B M6
	35AB0312	TR 2SA1037AK-T146 Q
Q7	35AB1592	TR 2SA1434-TB
Q704	35BB1017	TR 2SB806-T2 KQ
Q507 Q901 Q1 Q2 Q29 Q3 Q36 Q37 Q38 Q501 Q502 Q503 Q504 Q505 Q506 Q511 Q702 Q711	35CB0015	TR 2SC1623-T2B(180°) L5
	35CB0123	TR 2SC3734-T2B(180°) B23
Q709	35DB0317	TR 2SD1007-T2 HQ
Q714 Q715 Q716 Q717	35EB0001	TR FA1A4P-T2B(180°)
Q18 Q22 Q31 Q32 Q45	35EB0205	TR DTA144EKA-T146(0°)
Q23 Q30 Q33 Q34 Q35 Q46 Q516	35EB0232	TR DTC144EKA-T146(0°)
Q39 Q510 Q512 Q513	35EB0242	TR DTC114TKA-T146
Q16 Q17 Q24 Q26 Q28 Q40 Q41	35EB0247	TR DTC143ZKA-T146
Q19	35KB2490	TR 2SK1959-T1
Q14 Q25 Q27	35KB2491	TR 2SJ356-T1
Q43 Q44	35KB2498	TR 2SK3018-T106
Q701	350K3516	TR 2SA733/2SA733A-T P
Q601	35127950	TR 2SK211
Q703	35128022	TR 2SJ292(LF-B)
CR6B1 CR701	35595023	SCR 5P4J
*** DIODES ***		
ZD706	36BB0094	DIODE RD4.7MB2-T2B(180°)
ZD761	36BB0099	DIODE RD5.6MB-T2B(180°)
ZD705	36BB0102	DIODE RD5.6MB3-T2B(180°)
ZD702 ZD710 ZD711	36BB0122	DIODE RD10MB2-T2B(180°)
ZD703 ZD704	36BB0131	DIODE RD13MB1-T2B(180°)

SYMBOL	PARTS NO	DESCRIPTION
*** RELAYS & SWITCHES ***		
SW401 SW402 SW403 SW404 SW405 SW406 SW407 SW408 SW409	653F0054	TACT SWITCH SKHMPS
*** COILS & FILTERS ***		
MR1 MR2 MR3	39KC1037	R,NETWORK 1.0K 5% 1/16W
	39KC1049	R,NETWORK 10K 5% 1/16W
LC1D	61FK6584	FILTER,NOISE
L1 L15 L16 L19 L21 L24 L27 L28 L32 L33 L34 L35 L36 L37 L41 L42 L43 L501 L762	61KG0428	CHIP COIL (BLM21P300SPT)
L707	610F3023	COIL,FILTER 33UH
L702	610G0125	BEADS INDUCTER
L751 L761	610G0323	CHOKECOIL TSL0709-331KR36
L602 L651 L652 L708	610J9021	COIL BEADS (ZBF503D-00TA)
FL602	61062252	COIL,FILTER(SS11V-R17036)
FL501	61062253	COIL,FILTER(CM08RA20)
FL651	61062260	LINE FILTER(CM08RA27)
FL601	61062261	LINE FILTER(SS28V-R15170)
L601	61070328	COIL,CHOKE(TS15)
L653	61099152	COIL,CHOKE HP-054SZ
L701	61099162	COIL,CHOKE 120UH
L703 L705	61099163	COIL,CHOKE 300UH
*** PWB ASSYS ***		
	846A4A03	SW MAIN PWB ASSY
	846A4B01	SW SUB PWB ASSY
	847A9103	MAIN PWB ASSY
	847A9202	CN PWB ASSY
	847A9301	CTRL PWB ASSY
	847A9801	DC-DC CONV. ASSY

SYMBOL	PARTS NO	DESCRIPTION
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HQ602	31709806	TUBE INSULATOR 45T-17-25L
HQ601	31709807	CASE INSU 50T-T03P-02275
	32990205	INSULATING CAP TIC-3.5(YE
OSC1	64KA0294	OSC 10.000MHZ(JXO-5F)
F501	66671019	FUSE5AT 250V SEMKO 20MM
	866A4101	AC ADAPTER
F601	66671039	FUSE 250V 3.15A(215)
CN501	70051847	DC SOCKET TCS7960-43-2010
CN503	70056490	D-SUBSOCKET15PL(GMA-X15UG
	70521072	INLET AC-016-B-200
CABLE2	70800066	LINE CORD E-3 #8011
	73891183	DC CABLE
CABLE1	73893256	SIGNAL CABLE MD15-MD15 K
*** APPEARANCE PARTS ***		
	25429841	LENS
	25429951	COVER T,AC ADAPTER
	25429971	COVER B,AC ADAPTER
	25765841	LABEL(1*10)
	25786161	LABEL(TC095)
	25788191	NAME PLATE,INST.(ADAPTER)
	25851381	SCREW,SPECIAL(LH)
*** PRINTED & PACKING MATERIALS ***		
	24807261	BAG,POLYETHYLENE(220*320)
	24813191	BAG,POLYETHYLENE(150*370)
	25831362	BAG,POLYETHYLENE(900X900)
	25835221	BAG,PROTECTION(160*300)
	78133821	CN750(B) MANUAL
*** RESISTORS ***		
R709	40AAD173	R,CHIP 1.0K 5% 1/2W
R723	40AAD183	R,CHIP 2.7K 5% 1/2W
R713	40AA2129	R,CHIP 15H 5% 1/4W
R391	40AA2153	R,CHIP 150H 5% 1/4W
R1 R2 R3	40AA2155	R,CHIP 180H 5% 1/4W
R6B1 R6B2	40AA2181	R,CHIP 2.2K 5% 1/4W
R614 R615 R616	40AA2215	R,CHIP 56K 5% 1/4W
R617		

SYMBOL	PARTS NO	DESCRIPTION
L30 L31 L39	40AA9000	R,CHIP 0.0H 5% 1/16W
R221 R313 R411		
R422 R423 R424		
R433 R434		
R48	40AA9125	R,METAL 10H 5% 1/16W
R219 R220	40AA9133	R,METAL 22H 5% 1/16W
R74	40AA9135	R,METAL 27H 5% 1/16W
R168 R176 R350	40AA9137	R,METAL 33H 5% 1/16W
R380 R386 R387		
R388 R389 R449		
R60 R61 R62		
R71 R80 R88		
R377 R379 R415	40AA9141	R,METAL 47H 5% 1/16W
R416 R47		
R29 R30 R31	40AA9142	R,METAL 51H 5% 1/16W
R160	40AA9145	R,METAL 68H 5% 1/16W
R167 R238 R297	40AA9149	R,CHIP 100H 5% 1/16W
R298 R299		
R288 R85	40AA9155	R,METAL 180H 5% 1/16W
R356	40AA9156	R,METAL 200H 5% 1/16W
R10 R316 R319	40AA9157	R,METAL 220H 5% 1/16W
R322		
R50	40AA9161	R,METAL 330H 5% 1/16W
R208 R349 R426	40AA9166	R,METAL 510H 5% 1/16W
R15 R158 R159	40AA9173	R,METAL 1.0K 5% 1/16W
R341 R360 R363		
R365		
R183	40AA9175	R,METAL 1.2K 5% 1/16W
R315 R318 R321	40AA9181	R,METAL 2.2K 5% 1/16W
R325 R327 R329		
R57	40AA9182	R,METAL 2.4K 5% 1/16W
R11 R22 R24	40AA9183	R,METAL 2.7K 5% 1/16W
R72 R73 R81		
R82 R83 R84		
R324 R326 R328	40AA9187	R,METAL 3.9K 5% 1/16W
R438 R439 R440	40AA9189	R,METAL 4.7K 5% 1/16W
R441 R442 R443		
R444 R445 R446		
R447 R448 R58		
R59		
R156 R157 R173	40AA9193	R,METAL 6.8K 5% 1/16W

SYMBOL	PARTS NO	DESCRIPTION
R610 R611 R612	40AA2221	R,CHIP 100K 5% 1/4W
R613		
R601 R604	40AA2229	R,CHIP 220K 5% 1/4W
L20 L25 R406	40AA3000	R,CHIP 0.0H 5% 1/10W
R407 R408		
R6A2 R734 R735	40AA3125	R,CHIP 10H 5% 1/10W
R736		
R545 R551 R552	40AA3137	R,CHIP 33H 5% 1/10W
R553 R554		
R502 R508 R514	40AA3149	R,CHIP 100H 5% 1/10W
R520 R526 R532		
R547 R559		
R6B6 R748	40AA3151	R,CHIP 120H 5% 1/10W
R6B5	40AA3157	R,CHIP 220H 5% 1/10W
R538	40AA3159	R,CHIP 270H 5% 1/10W
R549 R550	40AA3161	R,CHIP 330H 5% 1/10W
R6A3 R745	40AA3165	R,CHIP 470H 5% 1/10W
R753 R901	40AA3166	R,CHIP 510H 5% 1/10W
R6B7 R737 R752	40AA3173	R,CHIP 1.0K 5% 1/10W
R711 R742	40AA3177	R,CHIP 1.5K 5% 1/10W
R555 R557	40AA3182	R,CHIP 2.4K 5% 1/10W
R751	40AA3184	R,CHIP 3.0K 5% 1/10W
R746	40AA3189	R,CHIP 4.7K 5% 1/10W
R764	40AA3191	R,CHIP 5.6K 5% 1/10W
R6A6	40AA3192	R,CHIP 6.2K 5% 1/10W
R505 R512 R517	40AA3197	R,CHIP 10K 5% 1/10W
R524 R529 R536		
R537 R701 R712		
R722 R730 R744		
R539 R543 R556	40AA3205	R,CHIP 22K 5% 1/10W
R558		
R560 R721 R754	40AA3213	R,CHIP 47K 5% 1/10W
R541 R544	40AA3214	R,CHIP 51K 5% 1/10W
R703	40AA3215	R,CHIP 56K 5% 1/10W
R609 R702 R720	40AA3221	R,CHIP 100K 5% 1/10W
R726 R738		
R739 R740	40AA3231	R,CHIP 270K 5% 1/10W
R6A7	40AA3245	R,CHIP 1.0M 5% 1/10W
R724	40AA3249	R,CHIP 1.5M 5% 1/10W
R741	40AA5129	R,CHIP 15H 5% 1/4W

SYMBOL	PARTS NO	DESCRIPTION
R37 R902 R903	40AA9193	R,METAL 6.8K 5% 1/16W
R212 R310 R344	40AA9197	R,METAL 10K 5% 1/16W
R345 R351 R359		
R361 R362 R364		
R366 R367 R368		
R369 R370 R371		
R373 R374 R381		
R390 R392 R393		
R417 R418 R419		
R420 R9		
R171 R172	40AA9198	R,METAL 11K 5% 1/16W
R353 R6	40AA9204	R,METAL 20K 5% 1/16W
R296 R376	40AA9207	R,METAL 27K 5% 1/16W
R16 R19 R21	40AA9209	R,METAL 33K 5% 1/16W
R257 R352 R354		
R7 R8		
R211 R342 R375	40AA9213	R,METAL 47K 5% 1/16W
R12 R140 R141	40AA9214	R,METAL 51K 5% 1/16W
R143 R149 R245		
R247 R248 R252		
R253 R272 R357		
R17 R18 R20	40AA9217	R,METAL 68K 5% 1/16W
R338 R355 R358		
R343	40AA9221	R,METAL 100K 5% 1/16W
R49	40AA9227	R,METAL 180K 5% 1/16W
R161 R162	40AA9229	R,METAL 220K 5% 1/16W
R506 R511 R518	40AB2131	R,CHIP 18H 1% 1/4W
R523 R530 R535		
R503 R509 R515	40AB2145	R,CHIP 68H 1% 1/4W
R521 R527 R533		
R6A4	40AB3155	R,CHIP 180H 1% 1/10W
R6A5	40AB3159	R,CHIP 270H 1% 1/10W
R705	40AB3166	R,CHIP 510H 1% 1/10W
R501 R507 R513	40AB3171	R,CHIP 820H 1% 1/10W
R519 R525 R531		
R540		
R542	40AB3177	R,CHIP 1.5K 1% 1/10W
R504 R510 R516	40AB3181	R,CHIP 2.2K 1% 1/10W
R522 R528 R534		
R763		
R6B4	40AB3183	R,CHIP 2.7K 1% 1/10W